Alessandro Ludovico
foreword by Nick Montfort

Tactical Publishing

Using Senses, Software, and Archives in the Twenty-First Century

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Series Foreword

Leonardo/The International Society for the Arts, Sciences and Technology fosters transformation at the nexus of art, science, and technology because complex problems require creative solutions. The Leonardo Book Series shares these aims of artistic, and scientific experimentation. It publishes books to define problems and discover solutions, to critique old knowledge and create the new.

In the early twentieth century, the arts and sciences seemed to interact instinctively. Modern art and modern poetry were automatically associated with relativity and quantum physics, as if the two were expressions of a single zeitgeist. At the end of the Second World War, once again it seemed perfectly clear that avant-garde artists, architects, and social planners would join cyberneticists and information theorists to address the problems of the new world order, and to create new ways of depicting and understanding its complexity through shared experiences of elegance and experiment. Throughout the twentieth century, the modern constantly mixed art and science.

In the twenty-first century, though, we are no longer modern but contemporary, and now the wedge between art and science that C. P. Snow saw emerging in the 1950s has turned into a culture war. Governments prefer science to arts education yet stand accused of ignoring or manipulating science. The arts struggle to justify themselves in terms of economic or communicative efficiency that devalues their highest aspirations. And yet never before have artists, scientists, and technologists worked together so closely to create individual and collective works of cultural power and intellectual grace. Leonardo looks beyond predicting

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dangers and challenges, beyond even planning for the unpredictable. The series publishes books that are both timely and of enduring value—books that address the perils of our time, while also exploring new forms of beauty and understanding.

Seán Cubitt, Editor-in-Chief, Leonardo Book Series
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Foreword

Nick Montfort

In Molière's *Le Bourgeois gentilhomme*, the ridiculous Mr. Jourdain learns during a philosophy lesson that he has been speaking in prose for his entire life—or at least as long as he could speak. One lesson we can take from Alessandro Ludovico's *Tactical Publishing* is that we have been publishing for, if not our entire lives, quite a while. Yes, we sometimes do writing that is not publishing—sending a text message to a friend, writing an email, developing internal documents at work—but our writing activity, even when it is short form and casual, is often bound up with publishing.

For instance, consider the practices of blogging, or its small-scale contemporary cousin microblogging, or the more specific branded tweeting that many of us now undertake. This is publishing, as it brings the writing involved out into the public sphere—although the terms we use can sometimes obscure this. When I visit the Twitter website, logged into my ordinary account, I'm asked "What's happening?" and given the option to tweet, as if this were all casual chatter. But anyone googling my name will find my latest tweets carved into the façade of that megacorporation's results page as prominently as a headline is in the *New York Times*. (Oddly enough, on the more obscure federated system Mastodon, the similar button honestly says "Publish!") Despite the suggestion that tweets are chitchat, presidents and popes publish their declarations to the world by tweeting. How long before we have a formal declaration of war or an ex cathedra tweet?

Tweets are not only retweeted and quoted in print newspapers but, as Ludovico describes, also presented on billboards and banners in seemingly unusual forms of republication. Automated systems of many sorts publish earthquake reports, fake news, and humorous mash-ups of headlines on Twitter.

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Tactical publishing activities are related to, and in some cases are clear instances of, *tactical media*, as seen in the subversions of technologies by organizations such as the Critical Art Ensemble. One important piece of writing about this concept was "The ABC of Tactical Media," sent to the influential nettime mailing list in 1997 by David Garcia and Geert Lovink. Rita Raley used the term to name her 2009 book, which focused on digital media interventions specifically. The phrase had been used occasionally in previous decades in relation to the work done by US Army psyops (psychological operations) forces, who work to win hearts and minds, or at least earn compliance, through leaflet and loudspeaker campaigns. In activist contexts, the idea is a broad one that includes not only digital art interventions but also various types of hoaxing through performance activities. *Culture jamming* is a kindred concept. Many, including Ludovico, have written about this type of activity.

Tactical Publishing brings the focus to one subset of cultural production, the sharing of textually based information through media such as books and newspapers, those things traditionally understood as publishing outputs. Here, we see how *tactical media* intersects with what is usually considered to be a lumbering and not very progressive industry and activity—although, as readers will see, this is a misconception. The current book follows on from Ludovico's *Post-Digital Print* to continue the discussion of how publishing itself is being transformed. This earlier book undertakes a serious and detailed comparison of print and screenic (including e-ink) publishing, uncovering more about why the world has not become paperless, what the commonalities between print and digital publications are, and how they find themselves opposed in some cases, complementary to each other in others. The historical perspective there, encompassing artistic interventions as well as industrial change, is brought to bear in the present book on how independent publishing can intervene to help us imagine futures, to compel us to be critical, and to resist dominant ideologies.

Rather than considering all artistic and activist activities, the emphasis in *Tactical Publishing* is on how these fit in the history and present condition of publishing. For instance, the Yes Men are discussed here centrally via their fake (utopian) newspapers, beginning with the 2008 *New York Times Special Edition* with its headline "IRAQ WAR ENDS." (This

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war did not, in fact, end until December 2011.) While the Yes Men themselves classify their production and circulation of this newspaper issue as "hijinks" on their site, and they are known for various other interventions, Ludovico places this particular one in a lineage of publications by artists and activists that includes an Italian newspaper cover of the 1970s (which ran headlines such as "The State Is Extinct") and faked issues of real newspapers beginning in World War II and extending through the early 1980s. In addition to weaving the story of particular radical publishing projects throughout the book, Ludovico concludes *Tactical Publishing* with an annotated bibliography, his own selection of a hundred important twenty-first-century publications.

Today's publishing interventions are often not fake versions of corporate media. Many take place within corporate social media and subvert the paradigms of these systems. This is the case with that automated online publishing done by artistic and activist bots. Ludovico analyzes factbot, which until 2021 produced text and image combinations positing often outrageous pseudoscience. These easily slid into Twitter feeds that included news items (perhaps of questionable provenance) as well as memes, potentially prompting more critical readings by making every day April Fools'.

As Allison Parrish has described, artistic bot creators approach corporate social media the way that skateboarders approach the city: They subvert it. A railing that runs alongside the stair, installed to improve safety, becomes something to grind one's skateboard along—a way to make things more dangerous. The ability to regularly tweet photos and texts, intended to allow users to love up on brands and feed consumerist impulses, becomes a way to disrupt our now bottomless reading experience. And while skateboards can be used for transportation and fun, we shouldn't forget that they can be weapons, too. Whether we see bots as inviting danger and different perspectives, subverting and reorienting corporate platforms, and/or weaponizing the tweet against dominant ideologies, Ludovico establishes that there are insights to be gained by considering them automated publishers situated in a history of publishing.

While some artists and activists are skateboarding, others are working as architects and builders of cultural institutions. Ludovico describes that tactical publishing today involves not only building individual bots, but

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also assembling entire libraries of very different sorts: virtual ones projected online, mobile ones brought via bicycle, temporary ones assembled for events and donated to institutions, even ones rescued from the trash.

These publication activities don't fit into the schemes of established television, newspaper, and advertising companies, or institutional libraries, for that matter, which are still focused on what (politely) might be called *strategic* publishing these days. Institutions undertaking this often cling to hope that the basic framework of publishing will stay in place. The development of new digital media technologies in coordination with new methods and genres of publishing, as seen in the social media realm, constitutes a more *logistical* intervention.

Amateurs talk strategy and professionals talk logistics, the saying goes. This classic idea may be suitable for the context of "symmetrical warfare," but the landscape of entrepreneurial and political disruption is different. The meaningful interventions that many agile individuals and independent publishers are making these days are bottom-up. Ludovico's tour of this intriguing landscape shows us that there are not just notable independent publishers these days: There are also insurgent ones. *Tactical Publishing* shows us possibilities for how we can publish, whether we run small presses, work as curators of mobile libraries, write bots, or aspire to learn publishing tactics and be part of the next wave.

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Introduction

London. During a 2019 mass demonstration in favor of the European Union (EU), a huge banner of eight hundred square meters is unfurled over the crowd gathered in Parliament Square. It is not a classic flag or a simple symbol or message, but a huge reproduction of a tweet containing a controversial statement by a Conservative politician, which is then streamed and recorded by drone cameras, and then quickly saved as clips and images on social media platforms. A forgotten but memorable digital brief publication has found its way into street reality as an accurate material reproduction on a large scale, seen by a huge crowd either physically nearby or connected from a distance.

Publishing is experiencing one of the most dramatic, transformative, and promising phases of its history. Having been first a professional technique, then a mass medium and, with the availability of personal media, an attitude, it is now gradually being transformed into a *commodified obsession* by the major digital industries. This obsession, which is a consequence of induced social mechanisms and behavioral software, can be countered with the same digital technologies that still have great liberation potential and with which independent publishers and artists are currently experimenting. A new *tactical publishing* can reclaim a humanistic approach that allows for fruitful social exchanges, a deeper embrace of our senses, clever publishing strategies, and the discovery and sharing of strategic content archived in libraries.

This book investigates a historical phase, focusing first on the two activities on which publishing is based—reading and writing—and how the digital industrialization of both can be balanced by awareness and exploration of a different, better reading experience on the one hand, and

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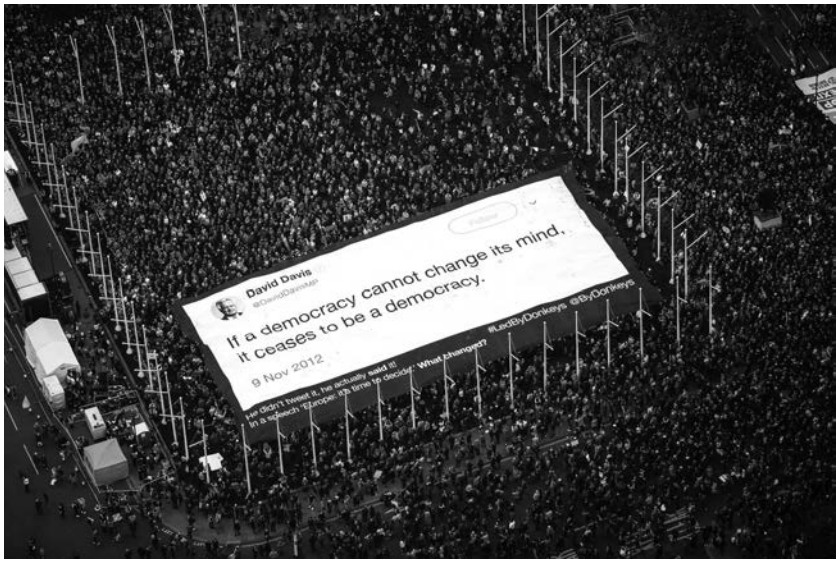

FIGURE 0.1
Led By Donkeys action "Put It To The People," Parliament Square, London, March 23, 2019.

the development of strategies exploiting software and networks to combine automated and human writing on the other. It then analyzes and deconstructs the paradigm and forms of *endless digital publishing* and post-truth that we are experiencing, proposing alternative strategies inspired by recent practices and unconventional uses of technology. Furthermore, the crucial social role of new forms of libraries is presented to complete the scenario of how artists and publishers can shape the coming publishing world in its various manifestations. Finally, I propose an expanded manifesto on publishing in the twenty-first century.

My previous book, *Post-Digital Print*, analyzed the state of publishing from a postdigital perspective, compared traditional and digital publishing through media history, avant-garde movements, underground culture, media art, archives, and networks, and formulated new ideas for publishers.

The continuing dynamism of publishing, caught between the renewal of analog forms and the unilateral digitization of culture, and its ongoing momentum can both be culturally and technically interpreted as its most promising breakthroughs. One of the most important points is to

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understand the transition between the postdigital phase we are experiencing now and the next phase, which can be influenced by an active role of publishers, readers, and machines. These can be informed and guided to adopt a different attitude that enables new structures and actions to activate the potential of publishing and preserving publications as an enriching social practice.

To this end, this book historically investigates the origins of some important aspects. From the *reading experience*, analyzed sense by sense in both print and digital formats, to the transition from ingenious generative content to weak AI-based writing robots in their various output formats, to the challenge of coming to terms with the *endless paradigm* of digital content publishing that was largely adopted by the industry and encouraged the attitude toward online *instant publishing*. Using past and present works by artists, activists, and independent publishers, these possibilities are analyzed and critiqued. In doing so, the book attempts to decode a few major controversial uses of publishing as a medium, including the admitted use of *fake* or plagiarized content to create a different public imaginary understanding of the mechanisms cleverly exploited by what has been defined as *post-truth*.

The radical and strategic use of print in the past can serve as a basis for the development of an alternative publishing system that transcends the dichotomy between paper and digital media production. This new ecology of publishing should be based on three main elements: the senses (understanding the content through the reading experience and its writing space), the software (how it shapes the infrastructure in which we can publish through specific forms), and the archives (preserving and sharing specific knowledge through targeted collections).

This book addresses the contradictions of the current media landscape in publishing: the lack (still) of commercial success of structural digital publishing, for example, which paradoxically goes hand in hand with the huge amount of free digital content consumed every day, calling into question the role of digital publishing itself; or the renewed interest of artists in the form of the artist's book, which often uses software and networks to accomplish specific results, and the question of how this fits in with traditional digitally enhanced publishing. It also considers the decline of the authoritative role of classical libraries in fulfilling contemporary knowledge needs

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and how this relates to the rise of *DIY libraries*, while large digital pirate collections of publications are increasingly shared and sometimes tracked.

The book links tactical strategies with artworks and experimental practices. After an analytical account of the current scenario, it attempts to propose suggestions for genuine contemporary publishing practices that support a comprehensive liberatory attitude toward reading, writing, publishing, and preserving content.

Chapter 1: The Realm of the Senses

This chapter focuses on one of the fundamental aspects of publishing: the reading experience—a crucial component of the overall attention economy radically transformed by digital screens in the twenty-first century. Within a few decades, changes in the space of reading, the medium used, the average length of texts consumed, and the time spent reading have led to today's digitally based *instant reading* practice, driven by established emotional mechanisms that govern a compelling emotional economy perpetrated mostly visually and mediated by global media on both their digital and printed media. Moreover, reading practice relies on touchscreen-based interfaces that define and enforce an industrially standardized reading experience whose prescribed gestures and interactions neutralize cultural differences that are then quantified, calculated, and stored on the other side to become part of the growing Big Data assets of hardware and software companies. Adapting to these de facto universal standards reduces both the awareness of our extremely sophisticated sensory receptors and the freedom to articulate them independently in the short and medium term.

Another possible reading experience will be articulated through the experiments with both physical and digital publishing of contemporary publishers and artists. The different reading experiences in analog and digital media are analyzed sense by sense to reinstate this awareness through a comprehensive definition of what constitutes the reading space in material and immaterial publishing ecologies.

Finally, some attempts to formulate independent strategies to learn and reclaim enriched reading experiences by combining digital tools and

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physical qualities are described through artworks and tactics that propose the multisensory as a method to overcome the purely visual.

Chapter 2: Nonhuman Writing

The role that software plays in contemporary writing practice is increasingly shifting from being infrastructural to being authorial. In an ecosystem populated by the need to publish instantly and extensively, and characterized by various established short forms, a few armies of *writing machines* are increasingly also populating it. This *behavioral* type of software is constantly evolving thanks to a strategic alliance between intelligent algorithms and referential databases, which can be equated with the old concept of the *literary machine*.

This chapter provides a brief overview of the history of automated content and literature, including an outlook on the possible implications for the future media landscape. The historical transition from the *plausible* to the *trustable*, to *authorial* systems of texts is analyzed. The need to learn to live with automatic authors is discussed, and the collaborative authorship of humans and machines is considered. The controversial possibilities of free sampling of popular material are explored, while showing how remixing texts through natural language processing has profound implications for our concept of authorship.

Chapter 3: Activist Post-Truth Publishing

The essence of post-truth is the verbal fulfilment of expectations, often polarized as either ideal or catastrophic. It springs from the power of individuals to publish and share instantly online, especially at the instantaneous speed of social media, and is based on a dynamic that attracts attention thanks to its potential to penetrate the public imagination. It is often strategically reinforced by an equally powerful image. Post-truth is a significant manifestation of the digital and its transitory technical nature, enabling the constant construction/deconstruction of sense through the popularity of social media infrastructure and its instantaneous production and consumption of content.

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It is important to trace the cultural origins of post-truth in the context of a structural institutional/corporate media crisis, especially with regard to the increasing criticism of its content and with perceptions of the *plausible* and the *real* radically altered by the speed with which we are constantly exposed to new content. Based on media plagiarism and subtle ambiguity, *fake* publications were used in the past for activist purposes that were sometimes literally *subversive* and even led to bans and confiscations. They were based on a particular form of plagiarism, not so dissimilar to today's post-truth, but with a very different agenda: to share the understanding of media mechanisms and allow everyone to use them.

By documenting lesser-known political examples over the decades, up to contemporary online news satire platforms, the deepfakes, and analyzing artworks that use plagiarism as a methodology, the post-truth appeal is deconstructed and contextualized to understand fakery before and after social media.

Chapter 4: Endlessness: The Digital Publishing Paradigm

Online publishing often adopts the format of endlessness, where the screen is infinitely scrolled with content, uploading new material as soon as it is needed, potentially without end, and leaving the reader to decide when/where to stop consuming it. This new paradigm is the latest step in an evolution that has been conceived since the first attempts to overcome the limited space of a printed publication, to create a *boundless* book that transcends its physical and spatial limits. This paradigm has evolved through early attempts to collapse information into smaller spaces to its explosion with the rapid advancement of media technologies, eventually leading to the *endless paradigm*. This paradigm has been made possible by the severe fragmentation of information through its short, popular formats. Among the direct consequences is the increased archival role played by printed publications, which have a new charm increasingly based on their offline dimension and use. The endless dimension can be understood as a new kind of *broadcasting*, where different kinds of information mix seamlessly: the personal, even intimate, with the public and

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the global (such as world news), based on what the collective Ippolita calls "emotional pornography."[1]

Starting with an archaeology of digital publishing concepts and their tension with an endless structure, the book discusses how current strategies are based on tailor-made, potentially endless loops of self-satisfaction. The resulting need to counterbalance this industry-based scheme with potential networks of critical human editors at different levels is explored, considering the need to reduce the insurmountable amount of knowledge we are exposed to and its resulting complexity and instead enable a focused, shared, and collaborative exchange of knowledge.

Chapter 5: Libraries as Cultural Guerrillas

The role of the library as a central cultural system is transforming into an as yet undefined new type of cultural institution, influenced by the spontaneous creation of various types of DIY libraries that connect to the central library system at some point. From the historical *personal portable libraries* to the contemporary concept of becoming *custodians* of publications in digital environments,[2] the selection and sharing of relevant knowledge is a strategic practice to liberate it from the strict rules of popular industrial platforms.

Libraries themselves should evolve from their historical and *monumental* role, still providing socially relevant services, to an expanded, networked, and shared knowledge infrastructure that competes with instant knowledge by creating social and cultural spaces of exchange. Two possible approaches are described to set these processes in motion and literally open the classical library system. One is to create *temporary libraries* that meet specific knowledge needs during cultural events and then transform into permanent, curated resources available to other temporary institutions. The other is to create *distributed libraries* to integrate relevant collections of expertise accumulated elsewhere into the traditional library system, without structurally interfering with it, and to create a network of DIY librarians who actively contribute to mapping these areas of expertise.

Through a case study of various temporary libraries I have personally curated, the aim is to demonstrate the opportunity to become one's own

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librarian while participating in their networks, recognizing the broader perspective to acknowledge the fundamental role of librarians as contemporary *information shamans*.

Chapter 6: How We Should Publish in the Twenty-First Century

This chapter contains a detailed list of important points to promote the development of truly contemporary publications, including experimental proposals, new updates of past open models, and possible future developments. It is compiled in the form of a discursive manifesto that emerges from the conclusions of the previous chapters.

The aim is to promote strategic integration between the analog and the digital from the perspective of a media continuum, through a model that should be at once consistent and open, gradually becoming scalable and retaining its properties of also being processual and negotiable.

The *calculated* and *networked* quality of publishing between digital and print is rejected to promote an intrinsic and explicitly cooperative structure that contrasts with the vertical, customer-oriented industry model.

Appendix: An Annotated List of 100 Experiments of Publishing for the Twenty-First Century

Finally, an appendix of one hundred major publications, both print and digital, is provided. Each entry is briefly annotated to highlight its particular importance for the selection. The appendix covers a wide range of concepts and practices and represents a possible collection of basic elements, a kind of *conceptual periodic table* for the realization of contemporary experimental publications.

It also represents a possible basic library of publication experiments that could inspire further innovations of established practices, and it is also a bibliography and a collection of individual case studies.

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1

The Realm of the Senses

We are technically reading increasingly more today than we used to, mostly from our screens, and from an exponentially higher number of sources. There have been a few studies on the effects of reading on a screen compared to reading on paper, mostly involving the varied perception of time and space. In the study "Reading Linear Texts on Paper versus Computer Screen,"[1] it was shown that readers perform significantly worse when they have to reconstruct the timing of a story from a book on Amazon Kindle compared to a printed book, because the digital medium "does not provide the same support for mental reconstruction of a story as a print pocket book does."[2] The perception of space is also challenged: in print it is mapped on a three-dimensional space with different reference points, but in digital it is mapped by a flat two-dimensional space with the additional layer of the graphical interface and its provided information as the only real reference point.

The time and space of reading are mainly determined by how we perceive the content and how we can process it. Jacques Derrida asserted this nearly a decade before the above mentioned study: "Paper is utilized in an experience involving the body, beginning with the hands, eyes, voice, ears; so it mobilizes both time and space."[3] The involvement of our perceptual organs, and thus our senses, in a content that, being printed, requires a certain immersion, results in altering our space and time as the content tends to define them. But when reading paper we do not disconnect ourselves from the surroundings. In contrast, the use of multiple media on a flat portable screen can, on the one hand, fully capture our attention visually and aurally. But, on the other, it can freeze our gaze

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in an autonomously illuminated dimension that lacks deep engagement and proclaims its inadequacy.[4]

The main question would be to understand what it means for our bodies and brains to read from screen and, in comparison, what it means to read from paper. To narrow down this question, it is significant to grasp how our different senses are involved in reading in each environment and to find significant elements that show how the whole reading experience takes place.

The Touching Simulation of Print

Printed media have a historically entrenched visual infrastructure, constructed primarily around the concept of a single unit of content, usually a page, and refined through centuries of visual culture.

The visual part of print is seemingly predominant over the involvement of the other senses, and it is the only one that does not require physical involvement through chemical (smell and even taste), material (touch), or vibrational (hearing) means. In our society, shaped by ocular centrism, this visual part has been increasingly, and very mistakenly, perceived as coinciding with the whole.

This seems to be the main reason why printed media are in the process of being massively translated through direct processes of optical rendering into another universal medium, the digital, which is mostly visually driven. Since print is perceived primarily visually, it is being completely reduced to its purely optical qualities, both by scanning and consequent release of files in specific formats, which circulate through overwhelmingly optical media and supporting networks. What is missing in this translation is much more than nostalgia for the traditional physical medium: it is a whole little perceptual universe that instinctually unfolds and is enjoyed every time the printed medium is used in a slightly different way, while being misdirected, if not richly negated, in its new universal screen-based embodiments. The main problem with this translation is the lack of specificity in the resulting rendition by the new medium, as the content we see on the screen is consistent with what we see on paper only optically, with a digital interface and a set of additional services. Thus, what we perceive digitally is a "simulation" of what we perceive on

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paper with very similar visual archetypes. This simulation is a complex process, in which the reader participates by executing code and processes that reenact the system used in print.[5] And this simulation is based on a computer, defined by Jeremy Shapiro as "practically and theoretically a simulation machine," a definition that we can also easily extend to mobile computing devices, which can perform the same quality of simulations as traditional computers.[6] The act of digitizing a piece of content can, thus, legitimately be interpreted as an act of simulation, and the digitized content, in this case printed content, as a dynamic simulation of a static copy. We can then assume that when we read a digital publication, we are reading a simulation of it, through a structurally different medium that is capable of hosting, representing, and transmitting it. Consequently, we can expect our senses to cope in a different way with this simulated environment and to adapt accordingly to its properties and modalities.

The Digital Reading Experience in Smell, Hearing, and Sight

The general discourse on digital forms of print emphasizes above all its extreme flexibility, which derives from its innate computability. What we see on-screen is the result of information calculated each time it is visualized, technically rendered from a coded set of acquired data. A digital publication can be carried around in an infinitesimal digital storage space, and it can be accessed, thus rendered, adapting to the display used, with a consequent set of versatile functions applicable to its data structure. To name a few: it can be searched through precise and composite queries, comprehensively analyzed through calculated quantification of its semiotic properties, and literally expanded in scope through links to external content of any kind, eventually cross-referencing the original text.

But all these instant qualities in the digital come at a cost traditionally underestimated: a completely different reading experience, compared to the models derived from print culture, determined mainly by a different balance in the involvement of our senses—or, as Marshall McLuhan defined it, the "knowledge of the changing sense ratios affected by various externalisations of our senses."[7] Today, apart from the limited resurgence of analog media, this externalization is articulated primarily

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through a single underlying digital medium, which computes and sends any information, encoded and quantified in numbers, to the target screen of choice anywhere in the world. McLuhan helps to understand this epochal change through his perfected concept: "The effects of technology [. . .] alter sense ratios or patterns of perception steadily and without any resistance."[8] This alteration, coupled with the absence of resistance, foresees our current sensory attempts to cope with the multiplication of endless information models.

Let us consider, then, the differences between print and digital reading experiences from a perceptual perspective worthy of sense-by-sense analysis. We can reasonably argue that digital content primarily uses one sense, vision, which is involved in interpreting its primary physical interface, the screen, which will be analyzed later. It is equally important to analyze the sense of smell, the sense of hearing, and the sense of sight and understand what contribution each makes to the overall experience. This is the necessary precondition to examining not only the intrinsic tactility of printed content but more importantly what we can tentatively define as the "material space of information" and the immediate consequences this has for publishing.

Smell

This sense has been conceptually almost absent from digital media. We can consider smell in this context from two leading perspectives: the smell of the medium and the smell of the content. The former propagates from the hardware, and it is briefly present when the reader device is very new, due to the initial heating of plastic and electronics, vanishing over time. In a study of users' perceptions of computer smell over the last few decades, it is shown that there has been a striking decline in its perception, due to several factors, including the use of improved technology. The study concludes that: "information technology becomes more and more 'deodorised.'"[9] It is worth noting that, even if we were able to perceive some sort of smell associated with the device, that smell would always, and consistently, be the same for this entire class of devices. It would then be the same smell associated with each piece of content, and especially with each publication viewed on it, which would make it useless for appreciating their differences, since it would break the strong connection our senses

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are physically predisposed to make between the two different elements: a specific content and a specific smell. Thus, a consistent single underlying smell would denature the original content after digitization, in a *lossy* process. This process is a direct result of the digitization, which makes it possible to have almost infinite content on a single medium. The collapse of the content space into a single device, namely a "container," flattens the original physical qualities of the various publications and their sense-oriented properties, reinforcing efforts to render them mainly visually.

From a pure content perspective, on the other hand, there are few strategies to compensate for the complete absence of smells in digital content. Some companies have attempted to synthesize smells as part of the increased commercial goal of producing "augmented digital books," but additional equipment is needed to produce them. For example, Vapour Communication built a prototype of what they called "oBook" for their title *Goldilocks and the Three Bears: The Smelly Version*, an e-book that would

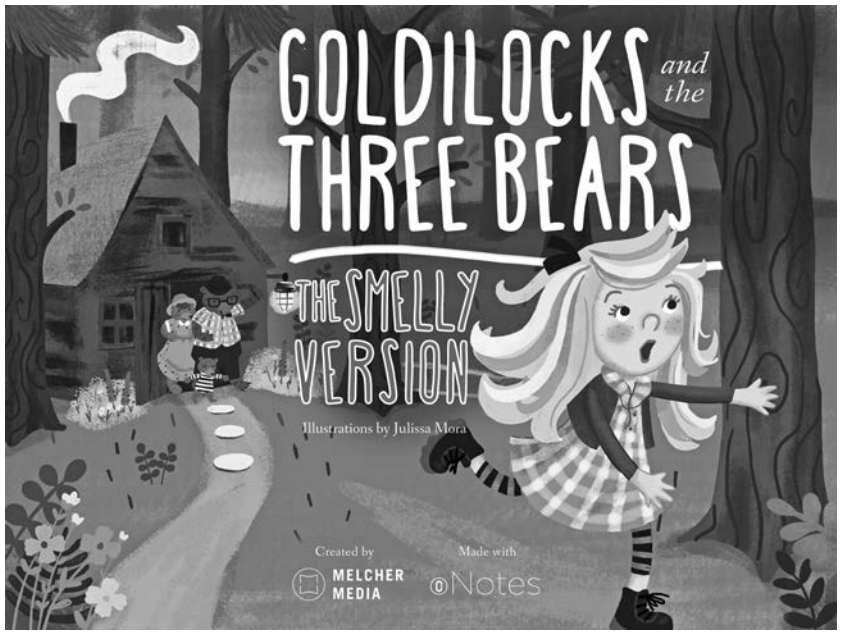

Figure 1.1
Goldilocks and the Three Bears: The Smelly Version, illustrated by Julissa Mora, 2015. © 2015 Melcher Media, Inc. and Vapor Communications. Illustration © 2015 Julissa Mora.

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incorporate various synthetic smells such as flowers, berries, and hot chocolate, among others.[10] At certain points in the story they are activated by "scent buttons" on the interface that trigger an external device, the "oPhone," to emit the respective prefabricated scents. This scent simulation solidifies the innate aseptic role of the digital, which requires another specialized hardware component to cope with a domain that is not purely visual. And the inevitable approach is to digitize this kind of information as well, to abstract it, and to make it universally identical for every user. This approach inevitably leads to the loss of the possible subtle or distinctive differences that are instead present in organic counterparts; it is these distinctions that allow for a more nuanced and less standardized reading experience. To note this aseptic quality, there is a well-known work that notes the loss of smell in the digital reading experience. It is the conceptual fake website that purports to sell its "Smell of Books™" spray cans with scents like "New Book Smell" or "Classic Musty Smell," advertised as a product to help e-book customers feel "more comfortable with their devices."[11] This irony still exists, even though expensive devices capable of synthesizing or "generating" a very limited number of scents by automatically combining basic elements have come on the market over the years.[12] A reliable and sophisticated synthetic scent machine is far from being built and commercialized. With the same kind of satire, even Google concocted an April Fools' Day joke in 2008, with a press release announcing an improvement to its Google Books search technology capable of rendering scents of "scratch and sniff" books such as *The Cheese Companion* or *Gorillas in the Mist* through a web browser.[13] These ironic strategies of ridiculing the need for a specific sensory enhancement of the digital media reveal the technically and conceptually unfeasible expectation of involving our sense of smell in digital content fruition, and especially in our reading experience. Print, in contrast, is probably the analog medium that has included smell the most, both accidentally with its own material decay and programmatically with workarounds to preserve the ephemerality of olfactory compounds. Digital media content does not even smell conceptually. This is largely because its calculated and ephemerally shifting nature of numbers converted to light on the screen structurally dismantles the other slow timing or persistence that smells require.

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Hearing

If the presence of smell can be easily detected, hearing may or may not be involved in reading digital publications. Digital audiobooks have become a popular product, thanks to their immediate digital distribution, giving the opportunity to anybody, from celebrities to random people, to produce and sell them. As a reading experience, I would tentatively associate them more with the radio paradigm than with the traditional publishing one. But they have become a standard format, increasingly available with the use of synthetic voices automatically reading texts and have started to give enormous accessibility of content to the visually impaired.

Nonetheless, in classic digital publishing hearing is involved both externally and internally. Content and software companies still implement a simulation of our gestures to turn pages, so hearing is externally involved in the functional sounds induced by our hands to functionally progress in reading. For example, the click of the mouse/trackpad/keyboard/buttons to increase or decrease brightness, the subtle swipe of fingers on the trackpad, or the gentle tap on the smartphone screen. Our upper limbs, and the body as a whole, are involved as a mechanical instrument to coordinate with the space and time dictated by the machine to relate to its content, and the sounds produced as a result are equally operational and universally abstract. As Anne Mangen and Adriaan van der Weel have pointed out: "The transition from reading on paper to reading on screens reveals the role of the body in reading."[14] We then understand that this role changes in relation to digital screens, in that they become purely functional in the operationality of the machine, and this pure functionality becomes even more evident when compared to the opposite and luxurious multisensory nature of paper, which I will analyze later on.

Inside the machine, sounds are generated by the system of digital interfaces. There has never been a sufficiently standardized interface for digital publications, except for the reading software of Kindle devices. But there are a plethora of open and proprietary software systems that deal with different document formats and lead to just as many concepts of engagement with digital content. Hearing is generally stimulated by the interface for two different purposes. One is to better simulate the physical experience and compensate for the lack of sound that results from the physical manipulation of print. Typically, the interface restricts its aural

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domains in this regard by triggering a single sound sample as the user virtually turns the pages. It is a single one that is repeated each time, and once our ear is trained to recognize it, it fades into the background, bringing no further information to our reading experience but merely confirming through audio feedback that the page turning request has been fulfilled as a classic predictable universal cause-effect relationship. Its role is that of a predefined "page-turning audio cue,"[15] which simply annotates with a predefined tone what is visually attended to and expected.

The other purpose of sounds in this context is to warn the user about a system-related event using alert sounds that are still integrated into the overall construct of the interface. Conceptually, these sounds do not belong to the reading practice itself but to the underlying software infrastructure. Thus, they relate to the metalevel of the interaction but have nothing to do with to the content. In fact, they are usually intended to draw attention to an impeding disturbance or to warn of something, and then, paradoxically, their role is to distract from reading by focusing on a machine-related event. Sound does not contribute appreciably to the experience of digital reading but is being used as artificial and universal feedback or as a trigger to divert attention from the content. Because it is almost exclusively tied to the interface, it is operational, never descriptive.

SIGHT

Sight is heavily involved in digital reading because the entire system is designed around what is happening on the screen and its predominantly visual interface. The digital's main property of flattening differences to achieve a general understanding is also reflected in sight. The *reduction to digital*, through the process of digitization, means that information is abstracted to a universal status, ubiquitously replicable on screen-based devices everywhere.

Thus, text appears consistently and ubiquitously in different spaces and times, with slightly altered brightness and contrast. These changes were even cancelled out by e-ink screens, which consist of half-white and half-black tiny spheres that guarantee contrast but also complete uniformity of pages. They are still used in e-readers, but all other screens we use have the classic retro-lit screen, the backlight, which ensures readability regardless of external lighting conditions, that is, anytime, anywhere, and

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that usually automatically adjusts to the environment, including the "night shift mode" that changes the colors of the screen to warmer light by subtracting the blue component to have less impact on the circadian rhythm of the viewer. But as with every other element of the human-machine interface, this is a universal behavior that switches to the same hues in every corner of the world at a given local time. The general backlighting paradigm is self-referential and focuses attention on the screen as the main source of content. It largely ignores the possible differences of what surrounds it, such as other forms of dim light, colors, reflections, and, in a sense, cuts them out with its light emissions.

We look directly at the screen, where the space of the page is replicated to match its size, and whose technical properties determine the status of all our digital reading for each piece of content. With the digital, the screen is the universal medium for any content produced in any time, space, and condition, for nondisabled people, of course. The multiple properties of the content (age, place of production, decay, size) are flattened to the matrix of available pixels, and its calculated and/or reproduced design is the only dimension worth mentioning. The software's scan or rendering of the page becomes its clean universal representation in a perpetual frozen state in which it no longer changes or deteriorates in any way but becomes the iconic, idealized version of what we used to know as publications.

Sight is then captured by the light and flattened by the character of this universal representational modality and becomes the only sufficient source of information about the content.

The Print Reading Experience in Smell, Hearing, and Sight

Smell

Paradoxically, classic printed publications, which are technologically poor, can claim a richer sensorial environment compared to digital ones, offering a wide range of stimuli for differentiated sensory engagement.

In the same order, smell is very present and often constitutes a real part of the reading experience. Smell indirectly provides specific information about the publication, suggesting its age, material composition, and state

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of preservation. The smell of printed publications varies greatly, even within the same olfactory range: old books, for example, smell of dust and mold to a very different extent depending on their exposure to light, which proportionally triggers chemical processes in the type of paper and ink used. Smell is also influenced by the conditions of the storage environment, such as humidity or proximity to pollutants. New publications, such as daily newspapers, books, and magazines that have just been published, still smell like fresh ink, but in a different way depending on the combination of chemical and organic elements used. Readers often associate the smell of some printed publications with certain content, as in newspapers, or with certain places, such as certain libraries or bookstores, where different smells add up in a certain combination, as in any closed environment. Technically we perceive these odors because there are several hundred VOCs, or volatile organic compounds, that books emit, which come from the chemical elements used to form the materiality of the publication, such as the type of paper, the binding adhesives, and ink. The combination of these factors, as well as the wood used for the shelves, for example, create much of the olfactory experience associated with libraries.

Aside from the chemical component, this experience can be highly subjective yet perceptual. In one study, researchers Cecilia Bembibre and Matija Strlic examined various libraries housing old books and showed the correlation between sampling chemical elements with general aroma categories and asking evaluators how they would describe their olfactory perceptions. The results were compiled in a referential "wheel" that demonstrates the vast differences in how readers perceive the smells of old books and proves how their physical presence provides a diversified ecology of chemical elements that affects readers in multiple ways.[16] This is a direct and unavoidable component during the reading experience of these publications. It is related to their organic nature and the large number of perceptual differences created by the way compounds are processed, which results in quite unique experiences for each reader. It would take a considerable number of resources to artificially simulate such an environment, and even the many attempts to isolate and then abstract a perfume reminiscent of a printed environment (for old books there is the *New York Times's* "The Times of New York," Byredo's "Bibliothèque," or CB I Hate Perfume's "In The Library," or, for the smell of new magazines,

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Figure 1.2
Smelling the Books by Rachael Morrison, 2010–2013. Michael Schmelling.

there is "Paper Passion" by Geza Schoen and Gerhard Steidl with *Wallpaper** magazine)[17] can be qualified as conceptual, sometimes ironic attempts, rather than an accurate universal simulation.

The relevance, subjectivity, and transience of smell in reading can be observed in two emblematic artworks that address these aspects.

The first is a performance by Rachael Morrison, Senior Library Assistant at MoMA, New York: *Smelling the Books*. She performed it from 2010 to 2013 by smelling and accurately cataloging the perceived smell of 300

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of the 300,000 books in MoMA's famous library. Beyond artistically reinterpreting her role as a librarian, her intention was to create a record of the remarkable olfactory differences of artists' books and to underscore how "these smells have an evocative power."[18] Confined to a very specific category of books, the performance carefully describes an olfactory identity for these printed publications. The information they singularly and uniquely provide, though subjectively described, identifies them through a distinctive material quality that is the premise for an equally distinctive reading. This performative reading experience reveals smell as a core factor in our reading experience of printed matter.

The second artwork is Eduardo Kac's *Aromapoetry*, which, instead, illustrates how we can potentially use smell as content through book and literary conventions for a perceptual reading experience.[19]

It is a limited edition book of only ten copies, in a classic A4 format with twelve "poems" consisting of smells. This, conceptually, allows the

FIGURE 1.3
Aromapoetry by Eduardo Kac, 2011. Artist's book with box and slipcase, twelve custom-made aromas enmeshed in a nanolayer of mesoporous glass, letterpress text, and graphics, 16 2ml vials with engraved titles, 11.69″ × 8.27″ × 2″ (297 mm × 210 mm × 50.8 mm), edition of 10 signed and numbered by the artist. Photo: Axel Heise.

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same interpretive mechanism as traditional written poems, as both text and smell can be interpreted in a very personal way, as can be seen in the Bembibre-Strlic study.[20] Kac defined his individual "poems" as single units on a page. They have "distinct olfactory zones on the page" and the rhythm between the different compositions is provided by the alternation of contrasting smells. The volatility of the different aromas is compensated for by the special structure of the page, which has a "nanolayer of mesoporous glass," which slows down the release.[21] The artist also provides the reader—collector—with vials and instructions for charging each poem. Here the smell is so carefully planned and embedded in the publication that it overcomes the underlying structure to become the predominant content. It acknowledges its own ephemeral status, despite efforts to potentially extend its technically short lifespan, but establishes a different encoding of smell for a deeper and contextualized involvement. Smell technically replaces text, or better, it takes on its own evocative role and becomes the central element.

These two expressive artworks, which would be simply impossible in a digital environment, reflect on the uniqueness of smells in publications and on their possible uses. The sense of smell, along with the sense of taste, is one of our two chemical senses and is processed in the cerebral cortex, where other mechanisms, such as the formation of memories, also occur.[22] The form of the artist's book seems appropriate not only for Kac's olfactory "poetry" but also to embed the concept of a permanent memory, compared to the structural volatility of smells. Smell is conceptually closer to digital than traditional media in that it is ephemeral and very difficult to preserve. Yet it clearly inscribes information into our memory that persists, even after the smell has completely disappeared. It is perhaps the most ephemeral medium, as it must be conserved, or stored, integrally. Once its source is exhausted, it simply disappears in a relatively short period of time. Nevertheless, the various chemical elements of printed publications last a long time.

Hearing

Hearing is transient rather than ephemeral, and in traditional publishing it is mainly to do with the sounds involved in the physical manipulation of the publication. The sound produced when the usually thicker

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cover of a book or magazine is bent or closed is different than when the inside pages are turned or bent. Also, the diverse types of paper used contribute with distinctive sounds when manipulated in various ways, creating a subtle acoustic environment for reading. We can easily tell whether the person behind us on the train is reading a newspaper or a book, for example, judging by the disparate sounds made when the pages are turned. Essential to perception is that each time a sound is produced by touching or manipulating paper, it is always slightly altered from the previous one, within a certain range of recognizability, whereas with the interface of digital publications, as mentioned earlier, it is always the same. There have also been several attempts to incorporate sound into the printed page to enhance the publication's sensory content: these will be analyzed as a case study in the final section of this chapter.

SIGHT

Finally, sight in print is also extremely diverse, and not just a linear sequential process as it might seem. In the late nineteenth century, the French ophthalmologist Louis Émile Javal analyzed eye movements during reading and proved that they do not move continuously along a line of text. Instead, the eyes make short rapid movements ("saccades") in combination with brief stops ("fixations").[23] In fact, we read only in the short pauses between these movements. So, we do not *scan* lines, nor do we swallow one letter at a time for immediate processing. We use our sight to read in a more complex way; it captures signs and elements, focuses on one word at a time, and reconstructs the whole in a rather "labyrinthine" and personal process.[24] The reading experience on paper potentially benefits from being static, as the eyes have all the space to read and spend less time making saccades to cope with the limitations of the screen. Also, the more sensorially rich the environment, the more perceptions can feed the process of reading, which in turn inspires us to find meaningful relationships in our past and present mental processes.

The page's illumination by a source other than the book is another essential element. The tone, brightness, and readability of pages depend very much on a variety of factors. The very diverse natural and artificial lighting conditions of the environment create equally varied reading environments: pages read in daylight by the sea are perceived alternately from

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those read at night in a living room. Added to this are the extremely different light-reflecting or light-absorbing properties of the various types of paper and printing inks that characterize the main product categories, such as newspapers, magazines, and books. This array of conditions allows the eye to perceive all the differences, guaranteeing once again a subconsciously enriched reading experience in the print sector.

Tactility in Reading of Print and Digital

Along with smell, hearing, and sight, touch is the sense most directly involved in the relationship with the published object, leading to even more radical perceptual differences in digital and print publications.

Our whole body touches, and is touched, because our cutaneous receptors are distributed throughout the body in what is called the "reflexivity of touch."[25] We perceive objects primarily through touch. So, we perceive the published object through touch by perceiving its physical boundaries and thus its physical size in space, which spatially reflects the size of its contents. We can then identify and contain it as a single cultural object. By touching the publication we also perceive its specific and detailed external and internal physical textures, whereas in the digital world, both must be perceived through sight and are thus technically codified, visually flattened, and simulated on the screen.

The sense of touch, like hearing, is so important that it is acquired before birth, and it is the first sensory process to become functional.[26] For humans, it is a primary and vital way of learning and understanding, especially in the careful evaluation of the differences between the various entities touched.

Yet, in the digital realm we use touch in a mostly functional format, decontextualized from its own natural qualities. The gesture of touch is limited to the hand, particularly if we still use a mouse, and usually, in both cases, to the index finger. In the more widespread use of the trackpad, and for the most part the touchscreen, the thumb is also involved, but rarely with more than one or two fingers of a hand. The fingers are functionally used for clicking, swiping, or tapping, in the same way for every type of content, with no haptic feedback beyond mechanical push back, clicking, and rarely some vibration. They are part of a growing *universal vocabulary*

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of abstracted gestures that is gradually being compiled and updated by the respective companies in the operating systems of digital devices. These gestures are codified in patents for interactions so that they can be used in a standardized universal modality that cannot be conceptually detached from the inescapable design of their digital interfaces, or from their underlying software and hardware, which is used globally regardless of cultural identity, behavioral, or gender differences. Moreover, we never really touch what we are supposed to, and sight is necessary to help to sustain this illusion.

The proprietary vocabulary of these "indexical" gestures has been used by artists to demonstrate a radical shift in our use of gesture, which can be defined as a true epistemological shift.[27]

Remarkably, artist Julien Prévieux pushed the idea of standardized gestures in his animated series *What Shall We Do Next?*[28] Here he presents a selection from dictionaries in what he defines as an "archive of gestures to come": a universally understandable translation of the interface gestures patented through the United States Patent and Trademark Office

FIGURE 1.4
Julien Prévieux, *What Shall We Do Next?* (Sequence #1), 2006–2011. Video still, courtesy of the artist.

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from 2006 to 2007.[29] The animation illustrates what he aptly defines as "prescriptive behavior":[30] a choreographic abstraction that describes familiar and acquired habits and the necessary reconfiguration of our bodies to match digital devices and their content. These gestures have specific properties that Aden Evens claims are "atomised, self identical, and absolute."[31] In the digital realm, then, the input from our fingertips is simply obliterated, even though they have the highest concentration of touch receptors and thermoreceptors of any area of human skin apart from our genitals. From being extremely sensitive to the broadband sources of input to our brains, they become neutral machine-oriented prostheses. In a sense our fingerprints become flat and insensitive to the machine, relevant only as a presence to press or change the electrical charge in a capacitive screen, reducing them to pure data.

Touchscreens have permeated our public and private spaces, so that these various gestures are now part of our more common behaviors. Jean Baudrillard envisioned this shift toward tactile deprivation and consequent simulation of their basic purposes: "in the era of the great electronic media [. . .] touch loses its sensorial, sensual value for us [. . .], it is possible that it returns as the strategy of a universe of communication—but as the field of tactile and tactical simulation."[32]

This anaesthetized way of using touch reconfigures our gesture-based behaviors, channeling them into a purely functional role that is stripped of its sophisticated capabilities. Our subjectivity changes in front of screens, reconfiguring our bodies, and their proprioceptive coherence.[33] Prescriptive behaviors trigger a whole different and more extensive range of mostly visual feedback, compared to the simpler interaction Katherine Hayles referred to in the late 1990s. They are typically associated with interface and content navigation, which has produced an internalization of these gestures and thus a perception of our bodies' boundaries that may begin to fade in the haptic and feedback loop we often have with screens. These instilled patterns of behavior can sometimes even mislead us to believe that our boundaries have expanded within reality. A classic example is digital native kids who, when confronted with printed maps for the first time, try to zoom in and pinch out, as they would with their screen-based devices.[34] This could be a result of them repeating the

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gesture so frequently. According to a 2016 study by software company dscout, the average user touches their phone to interact with it an average of 2,617 times per day.[35]

In traditional publishing, tactility gives a lot of information about the medium. In this regard, the process of paper selection is still an important part of the work of quality publishers. It gives information about color (sight), texture (touch), and scent (smell), which should be as consistent as possible with the overall content. Tactility primarily gives direct information without involving sight, in a nonoptical function. Readers already familiar with a particular book would be able to identify it by the texture of the cover, its size, and by smell, even blindfolded. In contrast, the only way to recognize an e-book, beyond its content, is by seeing it through the visual and digital elements of the user interface, such as the icon, title, or cover images.

The sense of touch, with all its implications, including the need to feel the materiality of objects, was explored by the art avant-garde. Among his various manifestoes, Filippo Tommaso Marinetti wrote *The Manifesto of Tactilism* in 1921, in which he elaborates the "education of the sense of touch" with the introduction of categories for tactile values and with a general training consisting of "the hands gloved for many days, during which the brain will attempt to condense in them the desire for varied tactile sensations."[36] He then proposes a series of learning experiments to be conducted in the dark, blindfolded, or underwater to appreciate the sophistication of our sense of touch. Some experimental publications made by the movement seem to be a consequence of this attention to the sense of touch. Among them *Depero Futurista* by Fortunato Depero, which was nicknamed the "Bolted Book" because the covers and the pages were held together by two metal bolts, and above all *Parole In Libertà Futuriste Olfattive Tattili Termiche* (*Futurist Words in Freedom—Olfactory, Tactile, Thermal*), which Marinetti compiled with the poet Tullio D'Albisola. It was nicknamed the "Tin Book," because the cover and pages were made of tin, and printed in lithography, which gave a very different sense of the distinctive materiality of the page.[37]

In traditional publishing this materiality has been exponentially expanded over the years, with a variety of technical possibilities to use other material elements on the pages or cover. These elements affect the reading experience through multiple senses, from sight (with special

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inks, reflective coatings), to touch (with laminations of all kinds, hollow punches, other materials integrated into the cover), and including the passing smell of some of these materials as well. They don't just add information; they add to the overall experience that appeals to those senses. Our senses are built to perceive a large bandwidth of information of different natures simultaneously. In fact, "sense" derives from the Latin word *sensus*, meaning "faculty of feeling," which appeals to the wide variety in nature, rather than mechanical or standard gestures and information. Tactility, like any other sense, is about noticing differences, and the more differences we learn to notice, the more we learn. And the more we learn, the more we can perceive, a virtuous and potentially endless cycle.

Tactility as Primary Reading Interface

If tactility is nonoptical, then its use to enable visually impaired people to read further demonstrates the dichotomy between *digital universalism*, which is functional for industry, and material uniformity, which is instead appropriate for our highly developed sensory abilities.

Historically, the technological approach has focused on the conversion of text to sound, as both were reducible to a universal form that eventually became the digital. The very first example was the optophone, which was developed by Dr. Edmund Fournier d'Albe of Birmingham University in 1913.[38] It was a device that used selenium photosensors to "scan" black printed text and then convert it to audible output, but it was very slow at one converted word per minute. After various unsuccessful technical improvements over the years, it was the combination of fast microelectronics with optical sensors and digital audio processing that produced the first commercial device. The Kurzweil Reading Machine debuted in 1976 with one of the first applications of OCR (optical character recognition) using a CCD (charge-coupled device) flatbed scanner connected to a text to speech synthesizer.[39]

But using audio to read text also means that the content is universalized and structurally disembodied. The digitized, or digitally born, text is read by a synthetic voice, always in the same predictable way, calculated each time it is spoken. The physicality of the braille writing system lies instead in its tactility. Modern "refreshable braille displays" are mechanical

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FIGURE 1.5
A student at the Perkins School for the Blind operating the Kurzweil Reading Machine, circa 1975. Courtesy of the University of Illinois Archives.

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devices that lift plastic pins in their braille matrix to form a character (the braille cell) and are usually digitally connected to a computer, tablet, or smartphone that provides the content.

Static, "printed," or (better) embossed braille, on the other hand, has similar characteristics to the printed page. The dots that form the sign are made of a solid material, usually paper, but any other solid material can be used. This material resembles the printed characters on a page but must be touched to be read using and stimulating the sensitivity of fingerprints to this particular material and the shape, size, and spacing of the dots. The process is designed to produce physical copies and a very physical reading experience. For example, the Library of Congress still funds production of braille editions of several magazines, including *People*, *National Geographic*,[40] and *Playboy*.[41]

The physical engagement of the braille reader is profound and goes far beyond simply touching a few dots. First, readers use both hands, and both can move independently, "perhaps simultaneously taking up information from more than one position," in a strategy that potentially sends and perceives multiple simultaneous signals to the brain.[42] Furthermore, while reading braille, pressure on the fingertips is transmitted to our sensory nervous system and then to the central nervous system, ultimately forming "neuronal groups in the somatosensory system representing Braille cell morphology."[43] The fingers are then activated as a complex and very efficient device that provides a "surrogate for the deficient sense of sight."[44] This surrogate activates a whole system of decoding materiality and constructing meaning that uses the situated sophistication of the body and potentially expands its possibilities.

The strict linearity of tactile written language has been reevaluated by one of the most conceptually advanced experiments in the field.[45] The Shapereader by Ilan Manouach is a system of "tactile storytelling" developed for visually impaired readers and makers of comics.[46] It is based on "tactile ideograms" (tactigrams) designed to provide "haptic translations of the semantic features, conceptual functions, and attributes of a textual expression."[47] Language here goes beyond the alphabetic and the illustrative, retaining the abstraction of the former and the explicitness of the latter. Linearity is renegotiated in an open syntactic arrangement, testing through its elements the possibility that we can create meaning by combining different elements, such as words and syllables.

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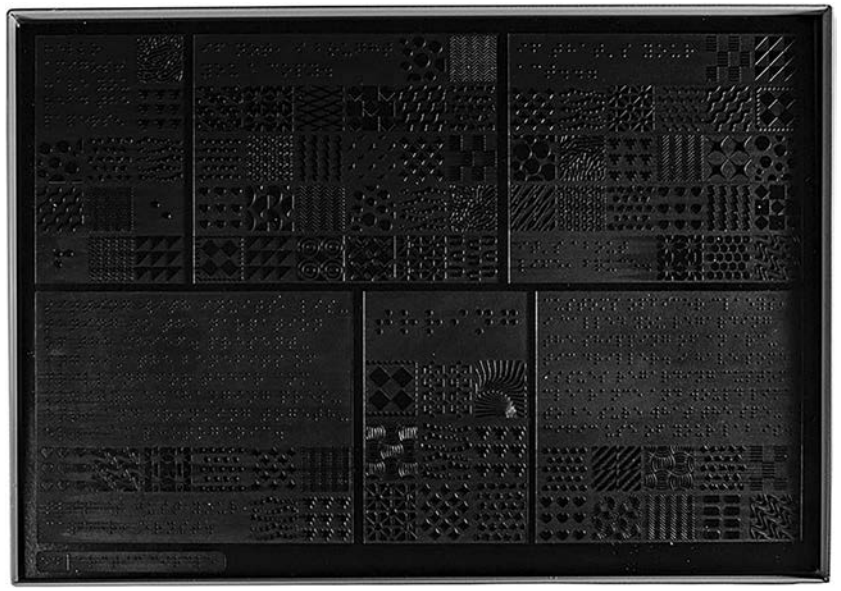

FIGURE 1.6
Arctic Circle (Shapereader), Ilan Manouach, 2015. Courtesy of Echo Chamber ASBL and Ilan Manouach.

The nuanced use of material forms enhances our tactile abilities. Ultimately, the physical and nonvisual approach of these systems proves that they expand our ability to read and write concepts. This is done by engaging the body and the brain in a different, enriching symbiosis, where reading and writing materiality has at least the same, if not a greater, impact than the optical.

Sensing the Invisible: Bacteria as Information

Taste was initially excluded from this analysis, but there is an outdated practice involving it in traditional publications, namely wetting the fingers while turning the pages. It is even more frowned upon postpandemic and strongly discouraged, but there are conceptually other elements of appreciating differences, and thus acquiring knowledge. This component in print publications is not always visible but also provides a type of information that potentially contributes to the overall reading experience, albeit

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subconsciously. When we wet our fingers and turn the pages, we not only pick up a "taste" of the publication but also the bacteria that are present on the part of the page we touched. Bacteria exchange information with each other and pass on information to the organisms they are hosted by. Sometimes this kind of information lasts a very long time and travels through different bodies, often by touching the same object. Potentially, different readers in libraries can exchange different bacteria through the same publications, and vice versa. But bacteria can also be exchanged from author to avid fan at a traditional author signing. And newspapers left or passed from one traveler to another on commuter trains, or the free branded airline magazines touched and read by different travelers on planes, can also pass bacteria between their respective readers. The former are passed over a relatively short distance over a day, the latter usually over a much longer distance in the course of a month. Would these bacteria transmit any kind of information that can unknowingly affect the reading of the host publication through the slightest impact on our human microbiome, or just an irrelevant number of pathogens?[48]

Organically and psychologically, there is no clear answer yet, but this further element underlines how the physical circulation of information can then be considered both biological and remarkably social, while the digital circulation of information is highly individualized by software but designed and constructed for very strictly private consumption by very strictly personal devices.

This circulation can be traced through bacteria on printed pages, which has also been explored by artists, as in *Biological Hermeneutics* by Sarah Craske. She has created images using the biological map from a rare early English translation of Ovid's epic poem in Latin, *Metamorphoses*, published in London in 1735. There she has found sweat droplets from a sneeze, bird feathers, human skin, grass, and other bacteria that even after dying release spores that could potentially be revived.[49] From this perspective, print may be the terrain where much microbial life can thrive, but in the digital realm, the strictly personal dimension limits this possibility.

Bacteria and their complex relationship to our bodies create a corporeality of information that elevates their mere content to an entire perceptual and biological system. A good part of it is not consciously processed, and some of it even potentially affects our own internal organism

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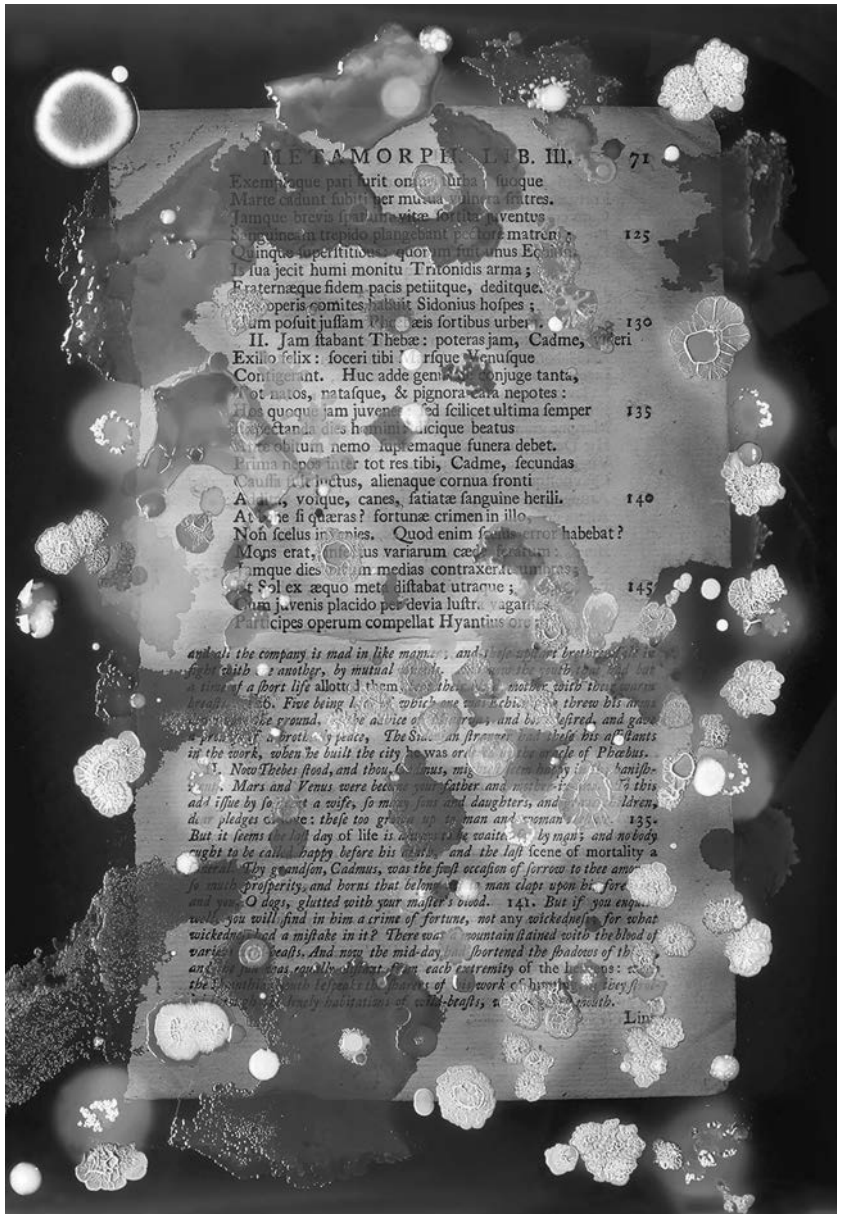
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Exem que pari furit on hurba fuoque
Marte cadunt subiti per mu vulnera fratres.
Jamque brevis ſpatium vitæ fortita juventus
Sanguinea tremido plangebant pectora matres ;
Quinque ſuperſtitibus quorum fuit unus Echion,
Ejecta humi monitu Tritonidis arma ;
Fraternæque fidem pacis petiitque, deditque.
Hos operis comites habuit Sidonius hoſpes ;
Cum poſuit juſſam Thebæis ſortibus urbem.
II. Jam ſtabant Thebæ : poteras jam, Cadme, videri
Exilio felix : ſoceri tibi Martiſque Venuſque
Contigerant. Huc adde gen conjuge tanta,
Nati natos, nataſque, & pignora cara nepotes :
Sed quoque jam juvene ſed ſcilicet ultima ſemper
Expectanda dies hominis, dicique beatus
Ante obitum nemo ſupremaque funera debet.
Prima nepos inter tot res tibi, Cadme, ſecundas
Cauſſa fuit luctus, alienaque cornua fronti
Addita, voſque, canes, ſatiatæ ſanguine herili.
At ſi quæras? fortunæ crimen in illo
Non ſcelus invenies. Quod enim ſcelus error habebat?
Mons erat, infectus variarum cæde ferarum,
Jamque dies rerum medias contraxerat umbras,
Cum Sol ex æquo meta diſtabat utraque ;
Cum juvenis placido per devia luſtra vagantes
Participes operum compellat Hyantius ore :
and all the company is mad in like manner, and
fight with one another, by mutual
a time of a ſhort life allotted them
breaſt
6. Five being
the ground.
a proof of a brotherly peace, The
in the work, when he built the city
Now Thebes ſtood, and thou,
Mars and Venus were become your father and
add iſſue by
pledges
But it ſeems
ought to be
ſo much
and
O dogs, glutted with your maſter's blood. 141. But if you enq
well, you will find in him a crime of fortune, not any wickedneſs; for what
wickedneſs had a miſtake in it? There was
variegated
the
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Lib

FIGURE 1.7
The Metamorphoses Chapter P71 by Sarah Craske, 2017. Photo by Sarah Craske.

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without us realizing it. But in this sheer and multifaceted materiality lies the luxury of producing a material publication, a multisensory object that is the emblem of a "material space of information."

The Material Space of Information

The reading experience is based not only on the intimate exchange between author and reader but also on the perception and content inside and outside the page, and depth perception plays a crucial role in this. If we consider the "reading space" as both the space of reading that we perceive, for example the content of an entire publication, and the space of content, as the awareness of the available content in a given space, we can emphasize further differences between the analog and the digital.

Space in general is a big issue in digital publishing. In its comprehensive simulation of what we experience in reality, perceived space is confined to a small two-dimensional screen. It has uniquely flexible representational qualities, especially in conjunction with the speed of certain actions, as we might experience when instantly switching from one piece of content to another, or searching for specific content within thousands of publications, or zooming in to appreciate details, or zooming out to get an abstract general overview of the publication, to name a few. But the potentially limitless space, as the screen can scroll and zoom infinitely and in any direction, is its great observational limit, as we miss the physical perception at a glance in a form that we are familiar with, like the overview of shelves in a library that, despite their size, can be clearly defined in space including their boundaries. We cannot visualize all the publications that are in a digital repository in a perceptually appropriate form, mainly because of the size limitations of the screen. We must either search for them, zoom in and out, or scroll until we find what we are looking for.

Our sophisticated depth perception is useless here, and this sums up other missing elements in the digital reading experience. The discernment of publication size, for example, is no longer perceptible immediately but must be imagined through data, such as the page number displayed, since there is curiously no interface that undertakes to render a publication as a whole in three dimensions. And there is another spatially perceived element that has been removed: knowing exactly where

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in the publication the reader is reading, compared to how much has been read and how much remains to be read. Finally, to maximize readability a single page is displayed, but this implies that the observation of left and right pages is no longer distinguishable, or it becomes irrelevant in the free flow of the digital EPUB format.[50] This approach makes it difficult to trace where we saw a particular piece of content, as its spatiality is reduced to a surface, compared to the three-dimensional references of physical publications. As early as the 1970s there were studies on print that proved that readers have some incidental memory in locating information on a page.[51] And today we can justifiably affirm that print publications have a "more obvious topography than onscreen text."[52]

Moreover, on two-dimensional screens the page is still rendered as perfectly flattened and clean and sourced from the same scan, replicated infinitely, so that it is exactly the same on any device, since it is universally standardized in a perfectly rendered simulation.

Digital machines are gradually being built to "learn," through training based on databases and relationships, to recognize the subtleties of similar content. But they are still very much based on the original schema of the output generated from processing the expected input, since digital processing based on computation must ultimately be unambiguous. They then communicate in a mostly intelligible way after they have processed their expected input correctly. As humans, on the other hand, we learn by being exposed to both unexpected input and ambiguity. This is the reason why our sensory system in the digital domain is subjected to the functionalism of interfaces rather than refining its perceptual ability. Digital interfaces operate on a restricted set of standard inputs, which in turn must be universal to be globally marketable. Therefore, we are rapidly adapting to the vocabularies of abstracted gestures and the standard approach to interpreting gestures; and we will continue to do so. But what we may gradually miss, through this paradigm, is the ability to express and perceive nuances of flexible and variable conditions, that is, in a word, the ability to express, perceive, and so learn an ample spectrum of differences.

Among contemporary media, printing is a rare exception: it is the only medium still in use, apart from the vinyl record, that can also be operated only mechanically, even without electricity, to enjoy its contents. It belongs to the *material space of information*, which can be touched and

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perceived directly and simultaneously by different senses. The touchable, hearable, smellable, and possibly tasteable information of print represents an important value for perception. In addition, beyond the information we can identify with our fundamental senses, there is a great deal of other information that we receive and transmit through our bodies and brains when we read but that is generally intangible: light, brainwaves, heat, electromagnetic radiation, to name a few.

When we touch a screen or printed matter, we instinctively try to establish a deeper sensorial relationship with it. But with the digital what we get from the senses is a visual simulation behind a glass. The separation of the glass screen cuts out the potential intimacy of touch, smell, and possibly taste. But through that glass the world of connected meanings and content can unfold ad infinitum via machine-regulated pathways, even if what is behind that glass remains at an unbridgeable distance.

In the case of printed matter, our senses tell us that we are dealing with an object that is singularly identifiable in physical space, so we are more open to printed publications that are particularly dear to us and often make an emotional investment. Then, retrieving that object in space and time becomes essential to feeling that this investment is protected. In the digital it is more difficult to relate to this kind of investment, as we are disconnected from it and grapple with the intangible, enormous size of digital space, which we experience through the small screen that is as small as a keyhole to a universe of knowledge. The screen has historically been a perfect technical window into the scalability of digital storage space, and it has evolved to its current enormous size, accumulated in part thanks to networked interconnection.

In particular, the user interface is still essentially based on the desktop metaphor of the late seventies, which remains largely unchanged, still, even in its mobile adaptations today. It is incapable of representing and communicating the amount of content we are currently dealing with and could be dealing with. In its touchscreen embodiment it is reduced to a "surface of indication,"[53] toward a flat "space of representation."[54] We are then confronted with an *infinitely vast desktop* with the few reference points that can fit on the small screen. True digital publications, conceived for a screen, must necessarily cope with this aspect of their own nature. In turn, however, they could also take the opportunity to exploit

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their unique ability to host infinitely reprogrammable and infinitely transmittable content.

Digital publishing has a lot of room for improvement. Trying to successfully simulate the print "interface" should not be the most important task. As Umberto Eco has repeatedly stated: "The book is like the spoon, scissors, the hammer, the wheel. Once invented, it cannot be improved."[55] It could be built on the ability to instantly create, combine, and, most importantly, compute both content and relationships between that content. For example, it is still disappointing that possible connections and extensions of a text, based on author, topic, and content, cannot be automatically retrieved or even suggested by the reading software upon request. These original qualities would potentially establish a different, original relationship with the reader and achieve an alternative yet functional level of intimacy in the reading experience.

In this kind of intimacy, tactility might play a fundamental role, even if there is no simple equation to bridge the gap between the flatness of our digital input devices and the biological qualities of our fingertips. There are plenty of industry patents about tactile touchscreens, but in reality they are still a perfectly flat glass that, at best, only gives very basic feedback.

On the other hand, there is the question of how to reproduce the extreme variety of textures and concepts we can feel with a single technology. It would be quite a difficult task, especially if we take extraordinarily tangible examples that purport to reflect both their tactile and cultural qualities. Consider a published object such as the book *Mémoirs* by the psychogeographic artist Asger Jorn and theorist Guy Debord, whose cover is covered with heavy sandpaper that subtly and immediately affects any material it should come into contact with, including hands, other book covers, and shelves.[56] Or consider the May 2015 issue of *Vangardist* magazine, whose limited edition of 2,500 copies were printed by mixing the ink with HIV-positive blood donated by three volunteers, while being certified one hundred percent safe to handle and carry.[57] Would these projects be correctly interpreted on a screen or fully represented by an algorithm? These are extreme examples, of course, as they might challenge the machine to encode and interpret materiality and conceptual

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FIGURE 1.8
Vangardist magazine, The HIV+Issue, #3 Special Print, 2015. *Vangardist* magazine GmbH.

design, but they certainly express how different the "substance," both material and speculative, is between physical and digital publishing.

In the first case it can meaningfully affect the reader by creating a risky material space of information, as in the examples above, and redefining the material values we normally refer to when reading, while in the second case the compelling representational flattening of the screen erases those values entirely. There are even more extreme cases, where the substance makes the publication so dangerous that it is inaccessible, like Marie Curie's notebooks written between 1899 and 1902, which are still so radioactive that they cannot be handled. They lie in lead-lined boxes in France's national library. Or the volume *Shadows from the Walls of Death*, printed in 1874 and written by Dr. Robert C. Kedzie, a surgeon, who warned of the dangers of the massive use of arsenic in wallpaper.[58] It contains a hundred industrial samples that contain a potentially dangerous amount of it when touched, so that the book can only be handled under special precautions. Paradoxically, the digital representation of these books,

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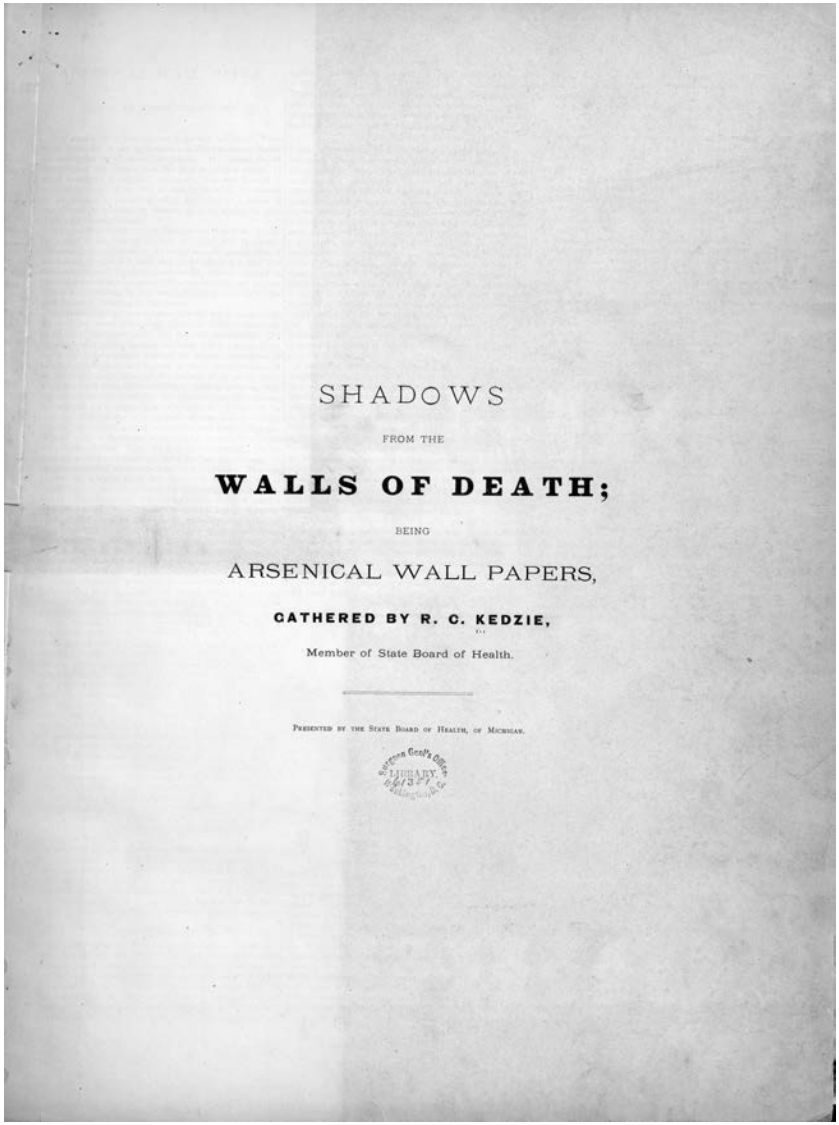
SHADOWS

FROM THE

WALLS OF DEATH;

BEING

ARSENICAL WALL PAPERS,

GATHERED BY R. C. KEDZIE,

Member of State Board of Health.

PRESENTED BY THE STATE BOARD OF HEALTH, OF MICHIGAN.

Surgeon Gen'l's Office LIBRARY 613.71 Washington, D.C.

FIGURE 1.9A
The title page for *Shadows from the Walls of Death*. National Library of Medicine/ Public Domain.

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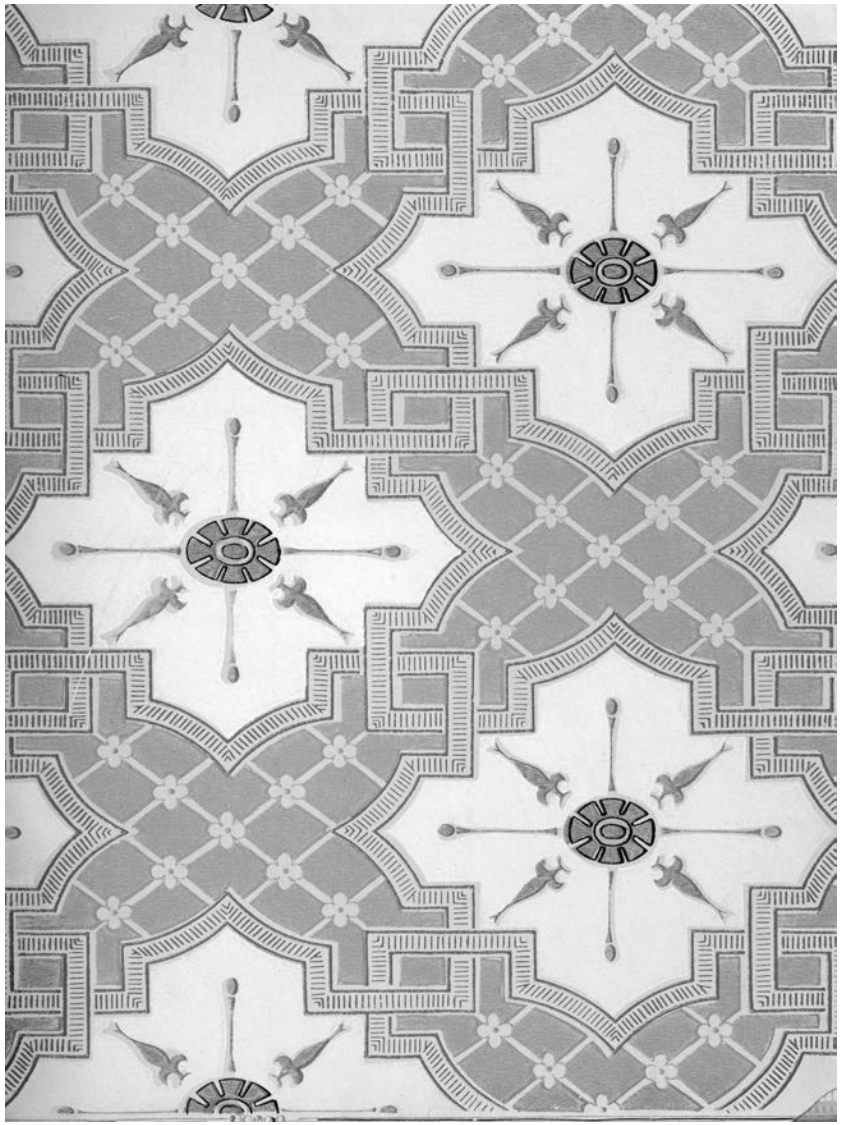

Figure 1.9B
A sheet of wallpaper from the book. National Library of Medicine/Public Domain.

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through publicly available scans, provides safe access to this level of content that would otherwise be almost impossible to access.

Nevertheless, tactility and materiality should not be excluded in digital publications and should go beyond current industrial functional standards.

Digital tactility should be developed to directly address our nerve endings and stimulate their very high perceptual qualities, perhaps using new artificial materials that can, for example, assume a congruent number of different states. The unfamiliar touch involved would challenge our sensory system to recognize and understand them. This would open the space of reading to entirely new material information, arguably expanding our knowledge.

So, if traditional publishing objects are well-orchestrated epicenters of information that guarantee a satisfying reading experience, digital publishing in its current standards and manifestations leads to a largely standardized, nearly identical, in some ways *sensorially deprived* reading experience, fixed in a screen-based encoded simulation. The underlying industry-implemented ideology of function continues to block the vast potential of software that could socially enable the perception of differences in reading and perceiving content. Not only through technologically oriented solutions—artificial and unfamiliar surfaces and sounds, for example—but even more through alternative reading practices that connect people and through further digital and physical sources and resources to enhance and extend content in perspective. Instead of being forced to follow the industrial top-down paradigm of a universally standardized and commodified reading experience, we should reorient the current purely behavioral approach in the digital toward an expanded and networked approach to perception that aims to enable social and cultural interconnectedness. This would potentially lead to new types of publications, or to new truly original versions of the same publications, that would combine a fulfilling reading experience with a strategic distribution of content.

A Case of Sensorially Expanded Publishing: How Publications Have Been Able to Flirt with Music

To articulate the different involvement of the senses in print and digital, it is useful to analyze the evolving relationship between publications and music from a historical and media perspective as a case study.

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Hearing plays a special role in publications about music. Such publications must deal with the absence of sound, even when it is the core subject, since sound cannot easily be included in the printed page in its audible form, so it is usually included only as a visual or evocative representation.

Nonetheless artists and independent publishers have experimented with inventive strategies to incorporate sound into their formats at different levels by including different types of sound media or paper-based sound media. This integration goes beyond the concept of multiple media integration, as it affects both publishing standards in paper and digital with striking differences and creates a symbiosis that leads to different reading experiences.

Sound Was Meant to Kill Print (After It Killed Oral Culture)

Historically sound was one of the first media to compete with print. The relationship between sound and print finds its roots in the early twentieth century, when the electrical transmission of sound dramatically changed the mediascape and the sense ratio of readers to listeners and also profoundly challenged the future of print.

Various visions of future audio transmissions were gradually supposed to replace the printed page as a medium. Illustrators such as Albert Robida and Jean-Marc Côte (also known as Villemard) envisioned future machines with connected wires transmitting audio content, including news, fiction, and nonfiction, to every possible urban location: from the street to the bedroom.[59] As a result, radio could not help but reinforce the supposed perceptual supremacy of hearing speech in real time over the delayed and more mediated reading of print. The involvement triggered by the radio voice was perceptually more personal and richer in the amount of information transmitted, compared to reading, with tones, timbres, and textures. Moreover, the speed with which the same amount of information was absorbed during a radio transmission triggered a quantifiable "gratification" as a turning point in communication that eventually proved not to be suitable for print.[60]

But before electrical media, printing, and even writing, the use of the voice, and thus sound, was the most widespread medium for transmitting

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information in time and space in what has been defined as oral culture. Oral culture is based on the transmission of knowledge through the spoken word and uses collective and personal memory as a repository. This system sometimes returned slightly different versions of the original content, in a slowly evolving narrative created using resonant sounds. Writing, first, with its accuracy and stability over time, and then especially printing, offered cheap and massive reproduction qualities that provided a more stable and silent alternative to oral culture, eventually almost supplanting it.[61]

Sound on Paper

Print and sound have often had an idiosyncratic relationship. A text that describes and analyzes music inherently speaks about a very different subject than that which speaks directly to the reader's senses. Publications about music have a very specific task: to describe and narrate something that cannot be easily represented in the space of the printed page but must be omnipresent there. The style of the writing and its content are, of course, independent of the representation of music, as they are subjective. But the reading experience and the overall comprehension can ultimately be enhanced by inducing an imagined perception of the sounds. This tension between discourse about the sounds, their verbal representation, and the sounds themselves is what Rachel O'Dwyer calls the "synaesthetic quality of writing about music."[62] And this tension has led to finding ways to incorporate music directly into print-based publications in a "recorded" or "encoded" format, usually to be played or performed by a machine, extending the reading experience to content on an external medium. The classical score is an abstract representation intended to be decoded and interpreted by a human and thus requires a series of imaginative, and subjectively slightly variable, subsequent translations. After recognizing the individual note, the reader must imagine a performer playing it with the correct musical instrument, so technically it does not contain recorded sound but a formal representation of sound, prone to interpretation.

By the end of the nineteenth century, it was already possible to record scores mechanically on paper that could be univocally interpreted by machines, which was considered objective at the time. Piano rolls were

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perforated paper rolls that served as scores for the commercially successful player piano, and the same concept was applied to music boxes. Their recorded music was programmed in a certain mechanical standard, which in turn guaranteed sufficient objectivity of the recording itself by a playing machine. There were many variations of this system using corresponding machines, such as a perforated disc made from paper that was produced in the same period and played by machines preserved today at the National Library of Spain.[63] All these paper-based systems housed functional recordings that were not attached to publications for a variety of reasons, such as piano rolls that were too big and lacked audience appeal; in a manageable format, such as those for music boxes, they could have been.

The Sounding Publication and Its Ephemeral Analog Media

The later availability of recorded sounds in a sufficiently flat format led naturally to the possibility of incorporating them into printed publications, thus expanding their scope into integrated and actionable listening. Historically, it has been music journals in particular that have embraced this possibility. They experimented with different formats, though they often struggled with the limitations of the media available at the time. After the advent of the small 7-inch vinyl records in the early 1950s, publishers began to include these, usually placing them within the pages of magazines or books to protect their intrinsic fragility. A notable case in this process was issue number 20/21 of *Revue OU, Revue de Poésie Evolutive*, published in 1964 by avant-garde poet and musician Henri Chopin.[64] This publication was accompanied by a 10-inch record containing the first anthology of sound poetry. *OU* was one of the first serial publications by artists to include record "extensions." The collection has become a valuable audio archive of these practices. It also introduced readers to the immediacy of reading about sound poetry, a practice somewhere in between music, performance, and literature, with the possibility of listening to it at will and possibly in the same space and time. *OU* was just ahead of its time in this respect. In those same years another technology was emerging for printing a lightweight record to be inserted into printed magazines: the flexi disc. It consisted of thin flexible plastic foils

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with grooves molded into them, initially nicknamed the "phonosheet" or "soundsheet." It was usually square with grooves in the center and a removable extension that allowed it to be stapled into the centerfold of a magazine or held in the spine. The celebrated *Aspen*, forerunner of cross-media artists' magazines, often included flexi discs with its issues, along with Super 8 film, postcards, games, objects, and other publications, all enclosed in a box: a sensorial triumph of analog media. To explicitly confirm it, they claimed in an advertisement printed in 1970 that, when a new issue arrives, "you don't just read it—you hear it, hang it, feel it, fly it, sniff it, taste it, fold it, wear it, shake it, even project it on your living room wall."[65]

Aside from several failed prototypes such as the "cardboard records" of the 1970s with poor groove detail that tended to deteriorate quickly by flattening if subject to weight, the last analog medium used to augment the printed content of magazines was the Compact Cassette.[66] It was less easy to attach to a magazine, as it was anything but flat, but still cheap, and light enough to be packaged with the magazine itself, usually in a cellophane wrap. Not many periodicals adopted it, however, but there is at least one specific example in the 1980s "cassette culture" scene that helped redefine the concept of the music magazine beyond its classic structure. *Musicworks* was created through a collaboration with an early sound art gallery (Toronto's Music Gallery) and expanded the printed section with a series of companion cassettes beginning with issue number 23 in 1983.[67] The cassettes included not only tracks but also conversations with the composers, excerpts from live performances, and audio documentaries explaining techniques and new musical instruments. The content was carefully introduced and described in detail on the cassette J-card, using multiple panels and in some cases referencing the magazine pages directly.

These experiments in integrating sounds into or with a publication aimed to expand the reading experience in a specific cultural art, music, using a different medium. In these latter examples, the synergy between the printed page and the sound medium was to maintain its primary format, print, and its role as a "directional container" for the audio content provided. Even though the sense ratio was altered, with hearing predominating or at least coming close to sight, the reading experience was maintained as balanced, with interaction with the printed page providing the basis for the mix of information to be enjoyed and interpreted.

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The Sounding Publication and Its Ephemeral Digital Media

With the advent of digital media, the printed directional role is quickly dismissed as redundant. The original structure of the magazine is reinvented with the newly available media, including the initially fragile digital storage and dependence on decoding by a machine. Music was present in the first generation of "disc magazines," including the early *New Aladdin*, an experiment of a magazine on floppy disc in 1987, as well as in the early rudimentary electronic magazines downloadable from the BBS (bulletin board system) networks, such as *Caustic Verses* in 1996, which was about the demoscene.[68] Both had text to be read on the screen, with no ASCII-based typography, and included music to be heard over the same computer as part of the reading experience, somehow referencing the construct of the videogame. The first generation of "digital magazines" whose content quality was almost comparable to that of printed magazines were published in the early 1990s on CD-ROMs and were intended to be, as much as possible, interactive, that is, to actively involve the reader in the reading process. This already foreshadows the limitation of digital publications, where a gesture is required to replace the small amount of content that fits on the limited size of the screen. A couple of examples were *Blender*,[69] which focused on pop music and included small videos and even advertisements, and *Launch*,[70] which focused more on a computer-generated three-dimensional environment for all the content. Both examples were early interpretations of what a digital music periodical should have been, foregoing the appeal of TV in the first case and computer games in the second, rather than referring to print structures. In both cases the text is minimized, overshadowed by cinematic visuals or the virtual three-dimensional perspective, resulting in a watching experience rather than a reading experience, but one that is still temporally and spatially limited because it is structurally offline most of the time.

The short-lived CD-ROM was rapidly replaced by the ever-expanding bandwidth of the Web. Publishing became potentially limitless in terms of space and time, and the concept of distribution, understood as the time required to make a cultural object available to be enjoyed in a particular place, was quickly disrupted. It was also the space of the magazine, or

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any other finished publishing product, whose boundaries were also being disrupted. The Web, and its underlying hyperlink structure, immediately became an integral part of a larger system in which content is interrelated, so that it theoretically extends infinitely, extending from and to each issue. One of the very early Web magazines, the rock-oriented *Addicted to Noise*, launched in 1994 and was the first online publication to include audio samples alongside reviews and interviews.[71] It also pioneered streaming services.[72] It represents an exemplary blurring of the dichotomy between the space of typographic text and the space of sound, which have literally merged into the same space. After nearly three decades of the Web, this publishing paradigm has not changed significantly, instead it has become the norm. The ubiquity of the networks has been joined by the rapid construction of a screen-based permanent information infrastructure through the widespread consumption of smartphones.

But while all the early digital publications mentioned above appealed to a niche audience, print magazines about music never stopped being published. On the contrary, they grew naturally, first on the Web, and then on social networks, gradually rebalancing their editorial and infrastructural systems.

Current printed music periodicals, apart from still including original music on CD, usually have a tangible online presence benefitting from enormous music databases and services, such as Bandcamp, SoundCloud, and YouTube, just as digital magazines do, and readers can listen to the music while reading about it on the same screen. They present a unique experience, because hearing is the only sense involved besides sight and all the information comes from the same ethereal medium. But after they are consumed, they simply disappear somewhere in the online world, along with the sounds, and are replaced on the screen by some other different content.

Technology-Driven Analog Media in Contemporary Publications

What then is the role of the printed page in the current media landscape of music publications, encompassing various digital formats and with a parallel resurgence of analog media, especially vinyl and cassettes? It

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becomes a different one: preserving the slower pace and conditions of the rich reading experience it can provide, and possibly offering mechanical music media that share the common characteristics of being addressable objects in space and time, rather than ephemeral links to streaming that are still very useful in terms of access.

There have been several attempts to produce nonstandard analog sound media with physically archivable products through technological processes. In the context of journals, *Au Clair de la Lune—For Édouard-Léon Scott and László Moholy-Nagy—(1860/1923/2014)* by Kazuhiro Jo represents a rather experimental format.[73] It is a paper record produced using waveforms in place of the audio source, cut into the paper with a vinyl cutter controlled by graphics software. The recorded song, "Au Clair de la Lune," was the first ever recorded. The paper record was distributed to subscribers along with issue 48 of *Neural* magazine, but it was also printed as an image in one of the magazine pages, which might also be audible on a

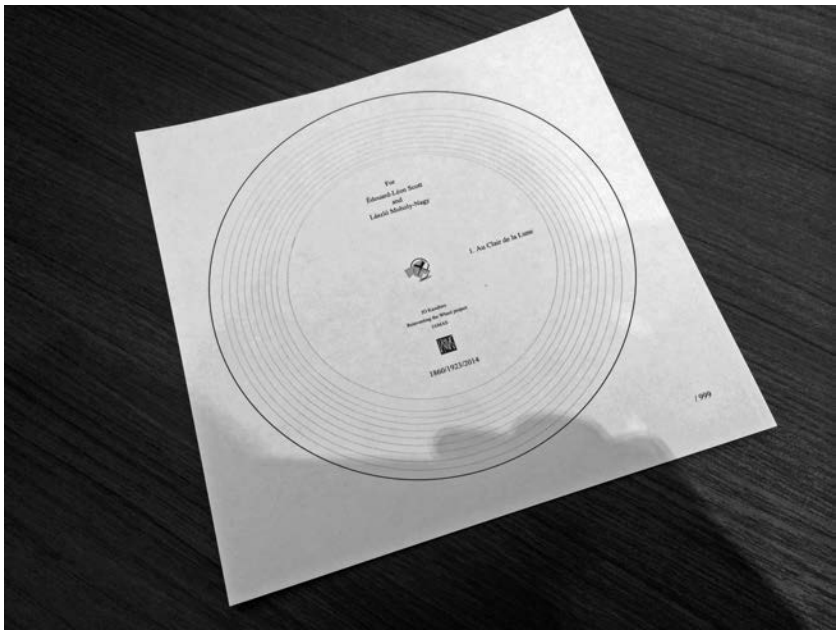

Figure 1.10
Au Clair de la Lune—For Édouard-Léon Scott and László Moholy-Nagy—(1860/1923/2014), Kazuhiro Jo, 2014.

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record player if copied onto cardboard and the lines/grooves engraved into with a sharp metal implement. The integration with a printed magazine is conceptually complete, as it has two forms, one easily usable adjacent, and one on the page that can conceptually produce infinite copies. Both are gloriously analog and yet could be read and played optically with special software.[74] Different perspectives come together in this product: it is the result of an experiment with sound materiality using paper, machines, and software. Yet it only makes sense in its physical form, where it can extend the reading experience, becoming both an archival proof of concept of a historical document and a fragile embodiment of processes made possible by digital technologies: the graphical transformation of lines into grooves and subsequent laser engraving. Finally, it is a versatile recording medium that perfectly integrates the knowledge of the magazine in question.

An exemplary case in the context of monographs, on the other hand, was developed by the sound artist Geert-Jan Hobijn who coordinated a publication celebrating his *Witteveen+Bos Art+Technology Award* exhibition in 2014.[75] The book has a cardboard cover that contains a small battery-powered electronic instrument on the inside left that responds to light and is equipped with a flat speaker, and a single 7-inch record with locked grooves on the inside right that is free to rotate but stays in

FIGURE 1.11
Witteveen+Bos Art+Technology Award book—Geert-Jan Hobijn/staalplaat soundsytem book including paper turntable and music instrument, 2014. Photo by G. J. Hobijn.

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place thanks to a small, glued-on, rounded rubber stopper. It can then be played by hand via a stylus glued to a longer piece of cardboard that, once bent, is perpendicular to the record. The two dimensions of integrable sound media within a thick cover embody the two souls of the artist but also show how analog and electronic can be configured to add a remarkable sonic dimension to a printed publication. Here, the sound cannot be enjoyed while reading, as the two integrations are an integral part of the monograph and must be operated to function. This is a design and a conceptual decision: to separate the space of listening, which requires the actuation of gestures, from the space of reading, which requires other gestures, and thus to illustrate how the systems for producing sound in a publication require the full attention and the associated senses to be fully perceived.

These two experiments integrating music artifacts and systems into publications can thus "sound," in their own limited space and at will, depending mainly on the curiosity and manipulation of the readers. The publication thus becomes an experiential one, which uses the systemic materiality of music media to engage the body, especially the sense of touch, further integrating the classical reading and listening experience.

The Music Magazine Reading Experience

The inclusion of the aural dimension within or alongside the printed page has been realized, or simply experimented with, through various strategies aimed at enhancing and improving the overall reading experience. As new technologies and new media became available, the symbiosis between the aural content and the correlated text became stronger and was configured in a variety of balances, with the sense ratio changing accordingly from case to case. The current scenario consists of a few print publications with various digital extensions and many digital publications whose forms also integrate text and sound. Most of the latter are based on short or relatively short posts, when not entirely based on a social media platform. Consequently, this cultural sector, like all others, testifies to the proliferation of a massive online availability of content that we regularly navigate and read extensively, sometimes in combination with the printed. So there is an important change from the past: we read

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mainly on screens, and the printed magazines, and their possible analog listenable counterparts, have become a luxurious, slower, if sensorially richer, dimension.

The reading experience, then, must be balanced between the entrenched rules of print and the speed and instantaneous abundance of content on the screen. The slow experiments with print appeal to us as whole sensory beings and encourage processes of complete learning. The rapid skimming of information through multiple digital sources and media instead pushes us to inform and update ourselves, but only for a short period of time before making room for more content, just as the screen in front of us does. A hypothetical combination of organic richness with the systemically networked and socially open digital world should provide opportunities to extend both learning and informing to our chosen circle of people and spatial/geographic dimensions and to share these processes with personally chosen communities.

However, while the senses appeal to our intrinsic human nature, there is a third element in this process, particularly in the creation and subsequent filtering of the content we consume, namely the machine, which is increasingly present and influential to our systems of learning and being informed. What then would be the role of the machine?

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2

Nonhuman Writing

The role that software occupies in contemporary writing practice has gradually shifted from being *infrastructural* to being *authorial*. The assemblage of sophisticated tools to support the usual writing processes have been increasingly permeated by algorithms that quantify, suggest, and, above all, predict, if not intervene in, content.

In a networked publishing ecosystem populated by the need to publish *instantly* and copiously, and characterized by a set of established short formats recognized by even the most traditional media, more and more armies of *writing machines* are finding their way in. The software involved has become a virtual "behavioral object" with its own autonomy, unpredictability, and hypothetical agency.[1] It is designed to have its own authorial opinions, and to interfere in the writing process. Formally, it was to support and improve the writing process, and informally to facilitate its production through statistically grounded predictions, thanks to the technical and commercial alliance between two relevant digital assets: smart algorithms and referential databases.

These technically sophisticated writing machines are now particularly oriented to fulfill the online platform market, which requires original and engaging textual content to increase the chances of deeply engaging the user, making extensive use of AI technologies to emulate traditional formats and recognizable styles.

This proliferation of writing machines could have a tangible impact on the future media landscape, both in terms of authorship and the reading experience. Increasing quality of the generated texts, combined with an essential trust factor over what is printed or displayed in influential

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digital spaces, defines these machines and the new publishing ecologies they create.

This seems to reflect the history of computing, as automatic writing systems are one of a long line of systems that apply combinatorial computations to texts. These systems have researched the machine production of plausible texts, then of meaningful texts, and now we are at the stage of predictive text, where consistency of style is sought. This continuous approach focuses on the machine and its productivity features. The goal is to produce a text that is perceived as *authentic* after we have calculated all, or most, of the previous texts that would have been necessary to produce it.

In this scenario, we need to shift the understanding of automatic authors as abstract machines and instead consider a hybrid authorship that involves a dialogue between humans and machines, especially when it comes to the nonarchival nature of the generated digital text. The perpetual regeneration of the digital text through its processes makes it ephemeral and thus the antithesis of a carefully crafted text.

All these approaches belong to a larger framework in which writing is ultimately seen as a technology itself. As Walter Ong put it a few decades ago: writing, after the oral tradition, is "the reduction of dynamic sound to quiescent space,"[2] which computers only continue. This continuation has been practiced and presented in fiction through various literary and software experiments over the years.

The subtle relationship between machines and language is now accelerating its evolution after a relatively long history. Soon after the first generations of industrial computers were built, abstract languages were formulated to interface the inner computational mechanisms of computers with human-designed processes. The relationship between humans and machines has evolved dramatically since then; most notably through the programming languages used to instruct the machine and the interface languages entered over time through text, visual metaphors, and, more recently, speech. The industrial characterization of the machine, to be increasingly trustable, has moved toward a progressive embodiment of anthropomorphic properties. The only significant innovation in human–computer interface after the "desktop metaphor" envisioned in the early 1970s, which is at the core of all modern graphical user interfaces (GUIs), is the interpretation of the human voice to encode it into commands understandable by the machine and the reproduction

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of a plausible synthetic human voice to interact with humans.[3] In the twentieth century, the main problem in developing text-based "natural language" interfaces that could enable wider use of computers was the inherent artificiality of the machine and the different logic of the systems controlling it. The original, highly technical text interface was replaced by the visual GUI systems, only to give way to a nonvisual and more anthropomorphic approach with the use of voice. This is one of the most essential media we use to communicate, and therefore potentially the most important human–machine interface.

To develop these natural language–based interfaces, research has focused on two key factors to acknowledge a machine's ability to engage in dialogue: the output should be *plausible* and *trustable*. Plausibility seems to have been technically built around consistency of content and context, while trustability has been built around mimicking human communication.

Plausible: The Combinatorial Writing

The idea of a nonhuman entity producing literary content, or more concretely, an autonomous writer machine, is inherent in the practice of writing through a reflection of its own most essential mechanism: the assembling of meaning through the combination of symbols and, consequently, on the conceivable mechanization and then automation of this process.

The first example of general-purpose content produced by a mechanical process was possibly Ramon Llull's "Thinking Machine," which he described in his book *Ars Magna* in 1290.[4] It was a mechanical machine with rotating discs made of paper, wood, or metal that could be turned individually to apply combinatorial strategies to concepts and sentences. In the process, many associations would emerge that could either be discarded or seen as illuminating new combinations. Jorge Luis Borges confirms that this machine was mocked by Jonathan Swift in his famous work *Gulliver's Travels* in 1726.[5] Here he describes "The Engine," a device mechanically operated by pupils, permuting words into a structure that produces parts of real sentences that are then combined:

> The Pupils at his Command took each of them hold of an Iron Handle, whereof there were Forty Fixed round the Edges of the Frame; and giving them a sudden Turn, the whole Disposition of the Words was entirely changed. He then commanded Six and Thirty of the Lads to

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> read the several Lines softly as they appeared upon the Frame; and where they found three or four Words together that might make Part of a Sentence, they dictated to the four remaining Boys who were Scribes. This Work was repeated three or four Times, and at every Turn the Engine was so contrived, that the Words shifted into new Places, as the square Bits of Wood moved upside down.[6]

Moreover, Gulliver added that he was shown a large folio of collected broken sentences that were intended to be put together.

Swift describes a working writing machine with a human "software" component that combines the association of individual words and then parts of sentences to produce the "writing." The output is assembled by analyzing, recognizing meaning, and formalizing it consistently. These elements have long been true of basic generative processes, and they still are, as we can observe in most software bots. They can be formalized as follows: a sufficiently large corpus as a source, a process that can become an algorithm to properly combine words from the corpus, and an effective strategy to consolidate a meaningful output. Once the procedure is tested and consolidated, it can potentially be repeated ad infinitum. This basic scheme has long been recursively and consistently applied to different machines, as it guarantees a plausible structure with a predefined content space. But in both the "Thinking Machine" and "The Engine," the machine is strategically considered only as an instrument that generates interesting content in mechanical form, which then requires the user's help to assemble the result into a new, truly original literary composition. The users demand to work with the machine rather than just expecting the production of a final text.

Both Llull's and Swift's machines were purely and visibly combinatorial and not too dissimilar to one of the early combinatorial machines, or "protocomputers," that mechanically elaborated literary content: the "Eureka" Latin verse machine.[7] Built in England in 1845 by the inventor John Clark, it could produce a new line of Latin poetry in hexameter verse each time. The "program" that elaborated the verses was actually a fixed scheme of adjectives, nouns, verbs, and adverbs that implemented a preexisting method called "artificial versifying," devised by John Peter and published as early as 1677, even before Swift's vision.[8] Its corpus was only physically present in the various compartments of the machine,

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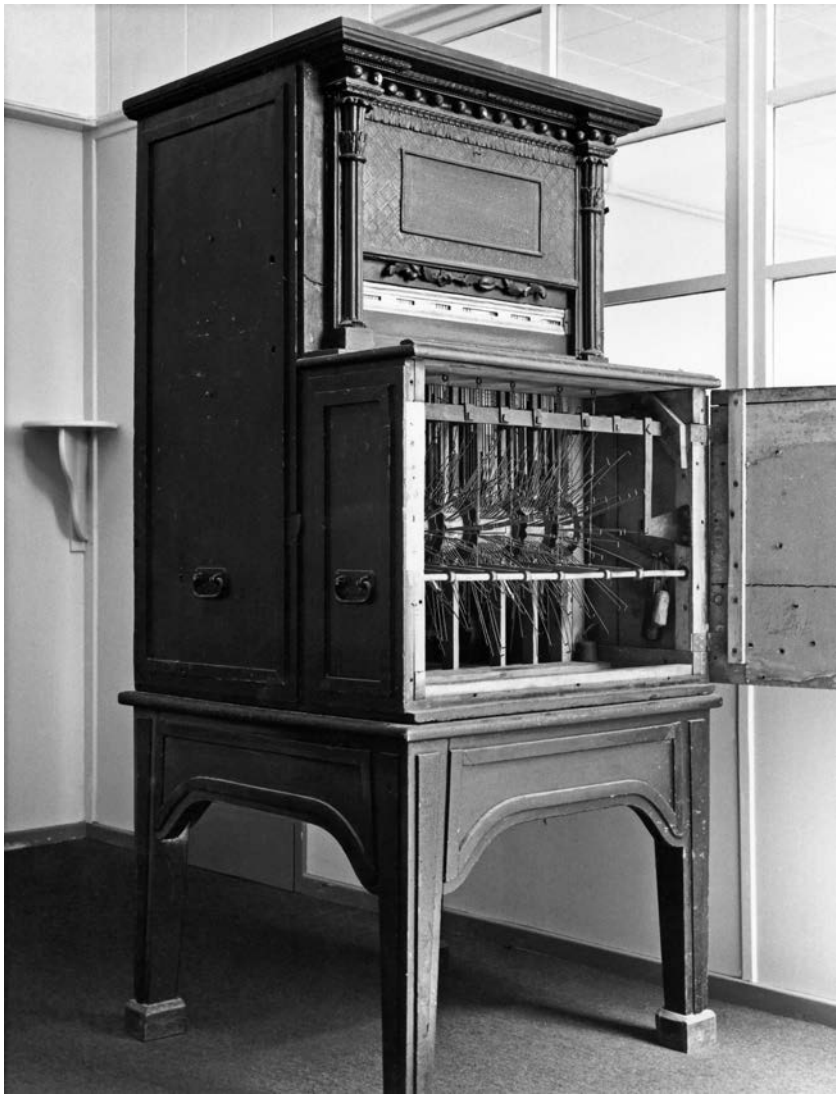

Figure 2.1
The "Eureka" Latin verse machine with front door open, 1951. Alfred Gillett Trust.

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divided by position and category; the number of possible combinations amounted to no less than twenty-six million. The consolidated procedure and the plausibility of the result were guaranteed by the structure and the restricted content. And its "computations" usually make sense, which gave the machine an authorial aura. The next generation of this kind of experimentation used a different kind of machine: the early computers with their abstract programmability, their immaterial mechanisms, and their formal instructions.

From the 1950s, early computers offered writers the opportunity to work side by side with computer programmers. The first example of literature being worked out by a computer appears to date from as early as 1952.[9] It was developed by Christopher Strachey, a programmer at the National Research and Development Corporation in Manchester. Working on a Mark I computer, facilitated by Alan Turing, he programmed a "love letter" generator based on a similarly simple scheme: a concatenation of fixed words and punctuation marks with adjectives, nouns, adverbs, and verbs from a given corpus based on Roget's Thesaurus (the work has been reconstructed both as online software[10] and as an installation[11]). In his article "The 'Thinking' Machine," Strachey debunks the myth of autonomous machines and explains how the mechanism implemented in the program "Love Letters" keeps producing "new" results, which are, however, quite limited in quality.[12]

We can find traces of this kind of combinatory writing in a long tradition, starting with Erycius Puteanus's "protean" Latin verse with interchangeable words, all combinations of which were printed in full in 1617, and ending with Gottfried Leibniz's *Dissertatio de Arte Combinatoria* of 1690,[13] which is based on the idea that all concepts are combinations of a relatively small number of simple concepts. We see it in Tristan Tzara's Dada poems,[14] instructions of 1920 in which the text was taken at random from a corpus cut out of a newspaper, and his poème perpétuel "La Rose et le chien" of 1958, in which the words change on the viewed parts of circular discs, the latter recalling the original Llull structure.[15]

All these works employ a combinatorial strategy with the common goal of producing a plausible text or literary product through the comprehensive rotation of elements. They all produce a plethora of results, sometimes exaggerated and useless, in search of unexplored combinations of

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meaning. The calculation of all possible combinations aims to overcome human limitations in writing and reduce the time needed to create them. But in this process, there is both a large number of unusable results and a lot of partially usable results. The recombination of elements in search of the exploratory plausible is based on the belief that the needed meaning is already there, just a few calculations away, and this inevitably delegates the process of composing to the machine.

Nanni Balestrini: "TAPE MARK 1"

This quality of calculated texts being plausible could have been tackled back in those pioneering years by looking at the machine not as a magic black box but as what it has always been, namely a very fast calculator; at its core it has never changed.

In the early experiments with computers and texts, designers, artists, and technicians often supported writers and self-taught computer programmers. The latter were indispensable in helping others to understand the machine, and the results were recurrently a joint effort. What they were meant to produce was a new kind of technological innovation based on a multidisciplinary approach that justified access to expensive but powerful machines at the time.

One of the most famous early experiments in electronic literature is "TAPE MARK 1" by the Italian writer and artist Nanni Balestrini in 1961, partly because it was later included in the historic exhibition *Cybernetic Serendipity* at the ICA, London, in 1968. Balestrini worked with an engineer to develop a computer program for the IBM 7070 that combined three poems by Michihiko Hachiya, Paul Goldwin, and Lao Tse into a new, meaningful work. The new work was composed after a careful selection of the printed computer output. The sessions took place in Milan in an underground bank office where the computer was located. The semiologist Umberto Eco and the avant-garde musician Luciano Berio were present and contributed.

One of the more than three thousand variations produced was chosen by Balestrini as an emblematic example and published in articles and catalogs. He made some minimal interventions to correct grammar and punctuation, which the author justifies with the "limited amount of

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code instructions used in the elaboration of the text."[16] This shows that, in this context, the machine was still an opaque entity for the participants. Balestrini entered this new space of semiotic elaboration and used the computing power for his own literary purposes. His intentions also seem to have included challenging the classical *space of writing* as the result was calculated, so that he wrote in a new space and stripped the integrity of authorship from three famous authors.

Balestrini assumes that "the problem was not to obtain from the machine an imitation of human processes, but simply to use the capacity of the electronic medium to solve with extreme rapidity some complex processes inherent in poetic technique."[17]

In "TAPE MARK 1," Balestrini radically envisioned the electronic processes as methodologies to subvert endless mass-oriented reproduction, and he assembled a proof of concept that in some ways demonstrated the "open work" theorized by Eco, as Eco himself explained.[18] In particular,

LA TESTA PREMUTA SULLA SPALLA L ACCECANTE GLO
BO DI FUOCO MENTRE LA MOLTITUDINE DELLE COSE
ACCADE SI ESPANDE RAPIDAMENTE GIACQUERO IMMOB
ILI SENZA PARLARE MALGRADO CHE LE COSE FIORIS
CANO ASSUME LA BEN NOTA FORMA DI FUNGO FINCHE
NON MOSSE LE DITA LENTAMENTE IO CONTEMPLO IL
LORO RITORNO CERCANDO DI AFFERRARE
IO CONTEMPLO IL LORO RITORNO I CAPELLI TRA LE L
ABBRA MENTRE LA MOLTITUDINE DELLE COSE ACCADE
LA SOMMITA DELLA NUVOLA GIACQUERO IMMOBILI S
ENZA PARLARE TRENTA VOLTE PIU LUMINOSO DEL SOLE
MALGRADO CHE LE C
TRONICI
TURA
Almanacco
letterario
mpiani
1962

FIGURE 2.2
"TAPE MARK 1" by Nanni Balestrini, Gabriele Zaverio, Emiliano Russo, and Vittorio Bellanich, 2017. Museo dell'Informatica Funzionante Computer Museum, http://museum.freaknet.org.

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he argued that it is not the single selection or the best selection that constitutes the work, as that would be comparable to what Balestrini himself could have done. It is the totality of the thousands of attempts, all of which are to be understood as variations, that define the work by its "variability" and give it the status of an "open work." What Eco seems to be reinforcing here is the dynamic aspect of this work, which connects different subjects, their lives, and society, rather than expecting the machine to autonomously create the perfect poem.

All the above combinatorial methodologies are created by machines using a literary source and process. They consolidate the potential influence of mathematics, and then cybernetics, on literary production and achieve results that cannot be achieved by classical compositional methodologies. In the same years, the 1950s and later, the Oulipo movement contributed significantly to these processes.

Oulipo: Writing as a Process

The pioneering history of automatic literature includes one of the most important and visionary literary movements of the twentieth century: the Oulipo (Ouvroir de littérature potentielle, roughly translated: "workshop of potential literature"). Founded by Raymond Queneau and François Le Lionnais, it was originally set up with the aim of implementing mathematics in literature and eventually involved a considerable number of writers, mathematicians, and academics in the production of a particular kind of experimental literature.[19]

The works produced by Oulipo writers are mostly based on the constraints imposed on writing by a variety of procedures and strategies characterized by self-imposed technical or conceptual limitations. These constraints are intended to enable a processual creation of the text, which is applied either to a new text or to a text that has already been written. The combination of elements, the concatenation of literary structures, or the substitution of nouns, verbs, adjectives, punctuation, or whole sentences is done according to strict rules and sometimes leads to remarkable results.

The recombinatory nature of its practices naturally involves a computational element, either purely mathematical, probabilistic, or scientifically ritualistic, formulated through the rules, like those of a mathematical

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equation or a geometric figure whose elements are connected to parts of a structured text. Oulipo and its practices emerged, probably not entirely coincidentally, in the 1960s, the same decade of cybernetics when nontechnical people were also gaining access to electronic machines and producing the first computer-generated literary experiments.

The shared theoretical fabric is the codification of a process and its execution, with different results depending on both the underlying corpus or specific text and the programmed structure. In this sense, Queneau's definition of Oulipo is explained in detail by pointing out the importance of structures as potential literature is "the search for new forms and structures which may be used by writers in any way they see fit."[20]

The form of this "potentiality" can be interpreted as the form of algorithms used in most of the prolific Oulipo works over the years. They used a wide range of forms established in literature, including poem, sonnet, sestina, short story, and others. They also used mechanisms such as permutations, anagrams, palindromes, exclusions, and more. This processual nature makes the works computable and almost always generative.

One of the most classic examples is Queneau's *Cent Mille Milliards de Poèmes*, in which each page is divided into horizontal strips, each containing one line, that can be turned independently, breaking the work down into specific units of information that break away from sequential order on the individual pages and throughout the publication. The title of the work refers to the precise number of all possible reading combinations, which cannot be performed in an entire lifetime, indicating a clear procedure, a sourced content, and a non-aleatory result. Queneau affirmed that "it has nothing to do with aleatory literature," which underlines the scientific character and rule fidelity of the whole movement.[21] And the finite, but large, number of iterations and generations, ultimately impossible to achieve fully, is a recurring argument in Oulipo practices. It describes the abyss of infinite generation associated with literature, which produces a potential endless spiral of too much text to possibly ever read, and which then expands to infinity in subsequent years with ever-increasing digital storage and accelerated computing power.[22]

ALAMO (Atelier de Littérature Assistee par la Mathématique et les Ordinateurs, or Workshop for Literature Assisted by Mathematics and Computers) was an internal group of Oulipo and was also represented

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in the famous exhibition *Les Immatériaux* at the Pompidou Centre in Paris. The group defined the development of literary software on three levels: the classical *combinatorial*, to permute interchangeable elements; the *applicational*, involving active programmed "decisions" that produce, for example, filtering from a corpus and active substitutions; and the *implicational*, which was to use the generative paradigm at the narrative level to produce complete works.[23] While the third level remained largely unfulfilled, there were some challenging applications for the other two levels. First level works include Paul Braffort's 1978 combinatorial work *Mes Hypertropes: Vingt-et-un moins un poèmes à programme*,[24] in which he applied the principles of the Fibonacci number sequence (each number in the sequence is the sum of its two predecessors) and the Zeckendorf theorem (any natural number can be expressed as the sum of two or more Fibonacci numbers).[25] He wrote six poems associated with the first six *numbers* of the sequence, and then elaborated further poems determined by these six using the same Fibonacci principle. In the sixth poem, dedicated to Calvino, for example, we find words and references that already appear in Hypertropes 5 and 1. The association between numbers and poems is less deterministic than a simple formula and leaves more room for the author's intervention compared to older computer-based works, but it must still strictly reflect the leading combinatorial principle.

Also combinatorial, but in a different literary form, is Marcel Bénabou's *Un aphorisme peut en cacher un autre* (translated as *Aphorisms: The Russian Doll Effect*) from 1980, which was created using software written in the programming language APL.[26] It consists of two different parts, a grammar and a lexicon, which are combined to produce DIY aphorisms. The grammar lists several formulae commonly used in aphorisms, such as a few words that are false synonyms, antonyms, or phonetically close, grouped according to their usage.[27] Here the chosen lexicon is combined with a formal structure consisting of a fixed scheme of popular aphorisms. This results in a large series of valid outputs, the meaning of which is often shifted into an uncertain territory. The recurring structure is also recognizable after a while, and the whole process becomes a running test in search of particularly successful combinations.

Programming languages have indeed been involved in these experiments. One of the earliest examples of the use of programming code as

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a poetic language was realized in *Poèmes Algol* (*The Algol Poetry*) by Noël Arnaud in 1968.[28] In this work, Arnaud expanded on an initial attempt by Le Lionnais to write poetry along the lines of the strict lexicon of the programming language ALGOL (ALGOrithmic Language). The poems, which have a more "applicational" status, are written with both the strict lexicon and an extended lexicon that uses syllables from the same lexicon. The short poems, almost haikus, retain their instructional character, and their source corpus coincides with the programming structure. The remarkable result, then, is that although they retain an obvious literary status, they contain in an abstract way the possibility of being performed as processes.

What all these works have in common is that they use structured and recognized forms, poem and aphorism, and rely on corpora to produce trustworthy results: other poems, a grammar combined with a lexicon, or the list of terms in a computer programming language. They show the machine's ability to adapt and be flexible to very different literary formats, abstracted and elaborated in the same way. Here the algorithm is a codification of a computable positioning of text, but the quality and impartiality of the selected corpora contribute to the trustworthiness of the results.

The systems implemented combine not only forms but also meanings and domains. *Poèmes Algol* is one of the first systems to combine a programming language with a human language to produce a readable hybrid form, and as Florian Cramer writes: "Software and language are intrinsically related, since software may process language, and is constructed in language."[29] *Mes Hypertropes* remains formal poetry, but the explicit connection between the parts of the poems defines the conceptual domains together with the underlying mathematical structure, creating a trustable composition. And in *Un aphorisme peut en cacher un autre*, the system works because of the prepared and rationalized corpus, which leaves room for the interpretation of meaning through the typically general tone of aphorisms. This attentive structure, in which man, machine, literary form, and literary content each play their part, is more than a mere generative process. The machine is essentially instructed to provide the calculated alternatives, while form and sources for content are carefully selected to be consistent and create a work that can be conceptually and formally acknowledgeable.

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In Oulipo the methodology employed is sometimes not even revealed, for example, by the mention of some vague "permutations of situations."[30] Undoubtedly underlying each work is a methodology, and even then the results are sophisticated, thus trustworthy rather than merely plausible. Among the many techniques invented or modified by the group, the "n+7" technique of exchanging words, especially names, with the subsequent seventh word of the dictionary is among the most classic and widely used among Oulipians, often producing pleasing results.

This movement represents the crucial transition from the initial fascination with writing as software elaboration in early computers to a more disenchanted and systematic exploration of text processing with increasingly trustworthy results. It is important to note that much of the movement was made by writers who focused on the potential of the literary work. Ultimately, they "saw text as the one and only goal," rather than seeing themselves as technicians who were more attracted to the potential of the machine.[31] What emerges in the work, then, are the multiple strategies of constraint and automatic production that are the primary algorithms for the compositional processes.

The generated results enunciate the unusual possibilities that a limited combinatorial strategy can produce. And this shows a more general perspective to consider when dealing with machine-generated content: originally, the goal was to generate content that was presumably indistinguishable from human-generated content, as evidenced by ALAMO's "implicational" level. And although it has been difficult to fully achieve this level, Oulipo seems to summarize and enrich all previous practices for generating procedural literature, which has a great impact on several other areas.

For example, there is an obvious connection between the new codified systems of Oulipo and the conceptual artists who were exploring the combination of algorithmic instructional structures and literature in the same years. Indeed, similar examples of *procedural literature* emerged in the prolific conceptual art scene, mainly organized around various scripts to be ideally or hypothetically executed. This kind of poetry—created using event scores (performance art scripts, usually only a few lines long, consisting of descriptions of actions to be performed) and started within the artist community Fluxus,[32] as well as the performance art scene—is

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clearly instructional and processual, combining concrete and surreal elements in a purely algorithmic form.

A famous example is Yoko Ono's *Grapefruit*, in which she composes poetic and dynamic event scores in her only artist's book.[33] Especially in section 4, "Poetry," her procedures are dedicated to literature. For example, her 1961 composition "Number Piece II" states:[34]

> Replace nouns in the book with numbers
> and read.
> Replace adjectives in the book with
> numbers and read.
> Replace all the words in the book with numbers and read.

The structure of this poem can easily be interpreted as an algorithm; it performs clear conceptual but specific tasks for the text of a book, resulting in a still formal structure but with abstracted codified content. Here the influence of the Oulipo is clear: even if there is a greater degree of freedom in the required substitutions, the numbers can be arbitrary, for example.

The score leaves room for the progressive deletion of text but also includes the act of reading that underlies and simultaneously accomplishes the changes, reinforcing the surreal association between words and numbers, and possibly triggering unexpected associations brought about by the interplay of the two domains, the literal and the mathematical.

A more explicit and behavioral piece by Ono, surprisingly even closer to the principles and practice of Oulipo, is "Syllable Piece," written in 1964:

> Decide not to use one particular
> syllable for the rest of your life.
> Record things happened to you in
> result of that.[35]

Here the self-imposed constraint of the forever excluded syllable recalls the classic self-imposed constraints at the heart of most Oulipo productions. Viewed from another angle, it is a classic gesture of the *search and replace* algorithm that, when practiced by a human, should become a learned behavior rather than a mere computational execution. Similar considerations can also be made for the formerly mentioned "Number Piece II."

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The potential discoveries of these new concepts and strategies mentioned above are close to more sophisticated mechanisms such as serendipity. Whether Oulipo contained a serendipitous aspect remains to be determined. Certainly, this was not publicly asserted by the members of the group, but the chance of finding a trigger, and at the same time having a "prepared mind,"[36] two of the essential conditions for initiating a serendipitous process, is more likely when reading works with such a number of unexpected associations between words and concepts.

It is possible that this also resonates in Ono's conceptual work when she relates different cultural domains to the practices and gestures described. More generally, this could be a possible strategy for automatic writing, freeing it from the myth of being equal to, or even better than, humans. Instead, allowing us to be instrumental in expanding our minds and thought processes to unknown destinations.

In this sense, most of these works seem to anticipate the contemporary attitude of creating abstract literary machines through a more impenetrable combination of sourced corpus, programmed transformation, and trustable output.

Trustable: The Influential Technological Context

We can recover strategies and ideas from the early pioneering period reembodied with new technologies. Technology is not just a neutral element in this process: it determines the scope of automatic writing, both by setting its own technical limits and by softening our biological limits thanks to its computational capacities.

One of the emblematic trajectories that has shown how a concept can maintain its consistency but allow for different layers of expression through newer technologies is another of Balestrini's experiments: the novel *Tristano*, published in 1966, and inspired by the love story between Tristan and Iseult.[37] He structured it into ten chapters, each consisting of twenty out of thirty possible paragraphs, and had them shuffled by an algorithm implemented in the same IBM 7070 environment as his "TAPE MARK 1." The software could possibly generate 109,027,350,432,000 different versions, but in the first edition, published in Italian by Feltrinelli in 1966, only one of the generations, defined by Umberto Eco in the preface

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as "pieces of Lego,"[38] was selected as the story was written. This brings to the computable domain a concept pioneered in 1962 by Marc Saporta with his *Composition No. 1*,[39] an experimental novel consisting of 150 unbound pages that could be rearranged at will and still produce a consistent story.

Tristano was subsequently reembodied in its original concept through print on demand technologies, first in Italian by the publisher Derive e Approdi in 2007, and finally in English by Verso in 2014.[40] Both publishers printed a unique number for each copy on the cover to explicitly address the concept. *Tristano* reflects on the evolution of print technologies through the digital (print on demand) and how the digitization of print and publishing in general is transforming print with an ephemeral mutability. The trajectory of combinatorial work in *Tristano* took more than forty years to be fully realized, illustrating the relationship between the available technology and the concept to be fully implemented. As Walter Benjamin put it, "The history of every art form has critical periods in which the particular form strains after effects which can be easily achieved only with a changed technical standard—that is to say, in a new art form."[41]

The movable type paradigm radically changed publishing by introducing centralized unprecedented speed in reproducing exact copies. The digital software paradigm radically changes it again by leading to decentralized production of copies, where each copy can be produced differently, allowing software-controlled modification of content each time a new copy is printed. This leads to a multitude of versions of the same book, each one unique, leading Balestrini to define himself as a foe of "the stiff determinism of Gutenbergian mechanical typography."[42] He envisioned and practiced this system before it was technically available, suggesting that a new machine-driven ecology of publishing might be possible. And I can add that it represents the potential death of the Gutenberg business as we knew it. It is at the same time the conceptual surrender of validated, unchanging content to the ephemeral and always potentially changeable quality of the digital. In a sense, it is the final step of software into the printed realm and the reflection of the typical uncertainty of reading the printed page on the screen. Yet its manifestation in this work remains an unchangeable single copy, but unique.

And although historical mechanical reproduction as a means of universally determining the content of a publication is consistently and

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profoundly challenged, it is worth noting that the structure of the novel is a dynamic combinatorial matrix, aptly written, validated in form by the classical visual structure of the book. The original concept of "so many different novels—so many copies" can thus be produced and becomes trustable as a technical consequence of the awareness of the available technologies and as a formal and visual consequence of the unique number on each cover.

Literary Tweetbots: Composing Software at Work

The specific context of publishing determines its reception and thus its trustability. We trust traditional printed matter because it is unchanging and produced in many identical copies. But how should we trust digital texts, especially when they are produced automatically and endlessly? The first experiments with computers revealed their electronic nature between the lines of limited computational abilities, which can still be seen in the printed publications produced at any given time. Today, other more complex ecologies of publishing have emerged that benefit from the potential vastness of the networked audience and the instantaneousness of the act of publishing. Among these ecologies, social media plays a special role. The equally desired brevity and immediacy of texts has a major impact on their production. Twitter, in particular, has always attracted writers for its constraint of text length, triggered by the potential challenges that this brevity brings, which has made the platform an ideal terrain for literary experimentation.

A shared territory of writers and programmers in contemporaneity are the literary bots, software robots, on Twitter, known as tweetbots. A significant number of them have been set up by users over the years to publish their output, regularly and automatically, as tweets. The popularity of this phenomenon has several characteristic aspects related to the publishing environment: The strict limitation to a single post makes it easier to program successful bots, as the output must contain a sparse amount of text. And the immediacy of publishing and the possible subsequent feedback make this environment particularly attractive as a test bed for experimentation with a range of minimal literary formats, down to single words.

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The *computational* and thus *processual* nature of these experiments has two major consequences: The first is the endless generation of texts, since they can be both instantly published and always available for reading, in an essentially unlimited space of writing. The second is that the results of any specific combinatory algorithm usually have a recognizable literary aesthetic, which is stated or only implied in the profile. The profile definition can potentially increase the trustability of the message, as it is associated with a specific account and thus an identity that we perceive as the *authorial identity*. This instinctive authorial trust also leads to

FIGURE 2.3
Non-words by Daniel Temkin, a zine containing a unique set of 45 nonwords generated by the Twitter bot *@nondenotative*, Aleator Press, 2017.

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possible forgeries, as will be analyzed in the next chapter. In social media, we only need a profile picture and a name to acknowledge an identity. Or at least their anthropomorphic representation.

The essential components of Twitter bots are the same as those of most automated writing programs: an algorithmic strategy and, optionally, a reference database. It is a mostly unnoticed ecosystem of artificially posting creatures that are nurtured by the software behind them. They resonate in the respective corpora and their recombination within a self-imposed structure.

More generally, the Oulipo experiments and their self-limiting, literature-oriented approach seem to be quite influential to this new generation of writing machines, as we can see from a few examples. With *lexicon-expanding* bots, for example, there is the diachronic perspective that expands language via the possibility of creating new words that can be understood and adopted as neologisms. The *@portmanteau_bot* created by Li Zilles, *@thricedotted*, produces new "portmanteau"[43] words such as "misuseful" or "overfilming" every hour,[44] automatically analyzing overlaps in words that are then merged into an often challenging potential neologism.[45] Using a different methodology but similar results, Daniel Temkin programmed Every Non-Word, *@nondenotative,* to give nonexistent English words the opportunity to become neologisms.[46] He uses a weighted collection of syllables obtained by matching the entire English dictionary with a hyphenation script to create words such as "wetmood," "automoon," and "endhetero." These two bots, even though they use procedures that might have been implemented in old computers, benefit from making the results available to a larger audience, and the feedback helps to recognize the most popular results. They can be viewed from two main perspectives: One is that they are "pushers of boundaries between sense and nonsense," acknowledging the machine as the main object of analysis, producing all the sense that is needed, and more.[47] Or we can see them as a collective elaboration to produce a common evolution of the official dictionary, supported by the machine and based on the random selection of possible new forms of a language, respecting its structure and rules.

The many *poetry-sampling* bots are even closer to the pioneering twentieth century recombinant algorithms for texts, which very often used poetry as a domain of intervention. Artist Ranjit Bhatnagar's ingenious

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@pentametron follows a hybrid strategy that, rather than relying on a famous poet's corpus, searches for tweets in iambic pentameter, selects them, and retweets them in rhyming couplets.[48] The effect is often hilarious, as the pairing is just the result of a calculated association that sounds more or less purposeful because of the rhyming but obviously is not, as very random contexts and associations of styles are juxtaposed in each output.

The *permutational bots* are also directly reminiscent of techniques used extensively by Oulipo members, such as the "perverb,"[49] a combination of two proverbs, and the "perverse,"[50] a cross between two lines of poetry. They used a consolidated scheme of combining different sources, using content from two or more of the same kind.

This is precisely the principle of Nicolas Maigret and Maria Roszkowska's Predictive Art Bot, *@predartbot,* which aims to generate ideas or titles for a potential artwork of the future.[51] Formulated as a typical headline from online headlines about digital art and hacktivism, the bot creates titles such as, "Turning glitchy deep learning into art."[52] In its insightful findings, it directly recalls McLuhan's definition of "the role of the arts and sciences as Early Warning Systems in the social environment. The models of perception they provide can give indispensable orientation to future problems well before they become troublesome."[53]

FIGURE 2.4
Predictive Art Bot V.3 by DISNOVATION.ORG, 2015–2018. Photo by Gabriel Asper.

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From a different perspective, but with a similar attitude, *@TwoHeadlines* automatically combines two headlines from Google News, for example, "Sheikh Mohammed releases 700 prisoners ahead of Kim Kardashian."[54] The subject of one takes the action of the other, and its strength is to always be topical and maintain the style consistently across different subjects.

By using news sources, these bots can trigger a potential serendipitous effect, a predictive gesture or speculative vision resonating with the practice and principles of William S. Burroughs's cut-ups. They take advantage of a more general *newsification* of communication (see chapter 4), which privileges the reading of short headlines over longer articles. They position themselves in the trustworthy realm because the evolution from the *plausible* to the *trustable* mainly lies in the acceptance of the content by a nonspecialized public, which happens systematically online. The abundance of content produced on social media prompts the audience to give feedback, which at a minimum can be a "like." It shows acceptance, or rejection if the content is simply ignored. And the greater the acceptance, the more the published content quickly permeates to a larger audience, in an escalating effect, because the algorithm structures primarily evaluate the *likeability*, or potential popularity, of the content.

Moreover, these tweetbots usually combine examples from two compatible sources but from different contexts and then follow a few accepted rules. They enter into a dialogue involving a machine and an audience of readers who are the social fabric of social media. This is conducted completely online, with a large production of output, and it's a consequent ephemerality. Involved are the author, the programmed machine that implements the writing system, and the reader who validates it, so that "it is the dialogue between the writer and the machine, as well as the dialogue between the machine and the reader."[55]

This is a very different publishing ecology from the pioneering 1960s, even if it uses very similar combinatorial techniques. These tweetbots also "live in language," as they use language as their primary matter, but this matter is instantly published in forms that are exclusively textual and reminiscent of their original structure and sources.[56] When the structural or content pattern becomes known, the appeal of the word combinations might start to fade away and the generations become opaque, turning the bot into an endless loop of repetitive exercises.

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Nevertheless, some tweetbots, like Every Non-Word or Predictive Art Bot, can be oracles of an unwritten future, using the plausibility of concepts and words, rather than attempting artificial rational speculation. The instant and recurring publication on the Twitter platform allows these experiments to be conducted continuously over time, and in some cases to practically experience another key Oulipo concept, "exhaustion of the generative power of traditional constraints,"[57] as one of its goals. It represents the limits of our reading and the conceptual limits of the machine itself. But it also brings the discourse back to the focus that the movement had, namely, the potential literature and not the expressive potential of the algorithm or the machine itself.

Unrecognized Literature as Conversational Tool

The algorithmic acquisition of a corpus to produce meaning is a linearly fluid practice, the key element of which is to properly structure the process of generation so that its production makes sense. Or as Miguel Carvalhais says, "the aesthetic experience of computation is often not about communicating a representation of the world but about the creation of a context for experience and reflection."[58] This means choosing a form of publication that is consistent with the content or, in other words, creating an appropriate *publishing context* that supports this goal.

Context is crucial for the public reception of a text. Decontextualizing a text, or publishing it in an inappropriate context, is thus a possible strategy for performative artists. A classic example is the use of well-known literary excerpts or entire works in chat conversations.

This practice has been done in the past by typing classic or lesser-known literature in online chat contexts. The resulting gesture has been applied many times in diverse social and technological settings. The main effect is to test an author's voice on an audience through their fictional characters: to assess recognition of their literary identity, and then to record their temporarily performed life as a live interlocutor. In this scenario, the selected work becomes the corpus, which makes a significant difference in its acknowledgment, as it was conceived by an author in its entirety and the consistency of its sequential structure can be used effectively in conversations.

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The use of classic literature in live online chats was done long before the advent of bots as we know them today. As early as 2001, Annabel Frearson performed her *BaudriR* by posting the text of Jean Baudrillard's book *In the Shadow of the Silent Majorities* in various chat rooms on the platform AOL (America Online).[59] Every single line of the text, including its bibliographic data, was posted in response to conversations about a wide variety of topics, such as "Pokémon forest" or "Hillary for Senate." Reactions were understandably varied, ranging from utter confusion to plain verbal aggression, but a very few people, according to the artist, nevertheless noticed the possible connection to the French philosopher.

With this painstakingly attained gesture, she has not only decontextualized the content of the book but tested it with people who would have probably never heard of it. Consciously or unconsciously, she points out the "limits of [his] theoretical work."[60] Through provocative action, the original work is broken down into pieces that are unexpectedly thrown into conversations. In the process, it becomes clear how a work that claims "that the strength of the masses lies in their silence and their ability to neutralise critique"[61] can be dismembered and returned to the same masses without them noticing, with very few exceptions.

In this context, Baudrillard himself states in *L'échange symbolique et la mort*: "In the exact duplication of the Real, [. . .] and in the shift from medium to medium, the real vanishes and it becomes an allegory of death. But even in its moment of destruction it exposes and affirms itself; it will become the quintessential real."[62]

The digitization of everything will eventually accomplish the massive duplication of the real and switching from one medium to another will become the norm. Chatbots have become an industrial standard, with a high degree of trustability, and are increasingly replacing humans in customer service support tasks. Chat, also called DMs (direct messages), PMs (private messages), or, in the past, IMs (instant messages), has permeated our daily practice in both our private and professional domains. In *BaudriR*, the shift from a theoretical book to a chat entry radically changes the context. A different publishing ecology emerges that includes an unaware audience reading in real time from an unknown source. The ecology of texting is disrupted by the nature of the content used, which is read line by line as a conversation rather than read in the architectural structure of a page.

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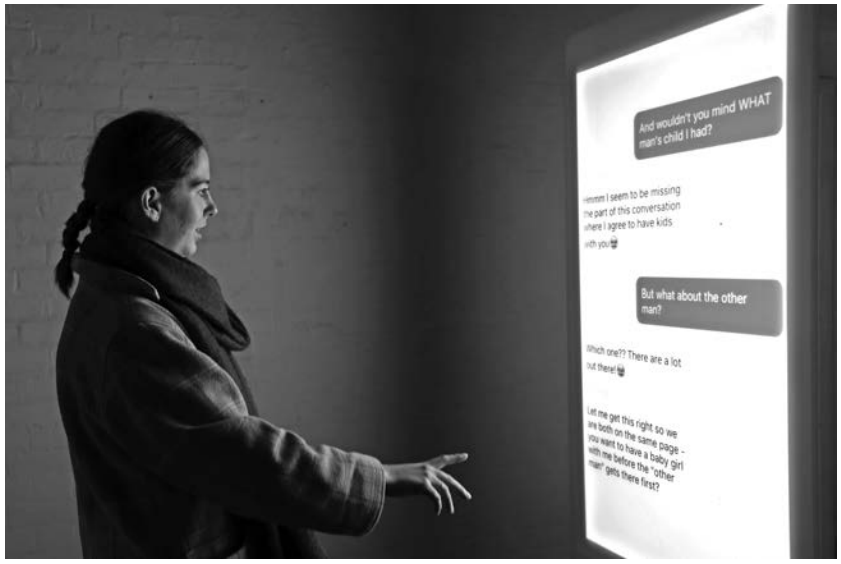

FIGURE 2.5
Lady Chatterley's Tinderbot by Libby Heaney, 2017.

This practice of chat infiltration has been practiced through other texts and in different contexts, so it can also be used as a conversational device. Libby Heaney's *Lady Chatterley's Tinderbot* is an apt example.[63] Heaney has programmed a bot that operates on Tinder, a social network that facilitates dating among strangers. It analyzes tastes and then converses with appropriate users using dialogue from the novel *Lady Chatterley's Lover*. This work exposes some aspects of our weakness toward chatbots. The power of vividly typed words, especially in a flirting environment, is extremely strong and easily passes a possible Turing test, as the dating software industry has proven through rather banally successful bots. If the articulation is secretly quoted from as sophisticated and consistent a source as a character in a novel, it is even more likely to be trusted as written by a human. Moreover, the temporal or cultural distance from literary classics older than a few decades makes these texts even more easily unrecognizable.

Again, unconscious feedback creates a parallel narrative consisting of a transference into another environment. The work shifts the publication ecology between two very different media but strictly adheres to the context of intimate relationships addressed and described only through text.

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W8ING by poet Sophia Le Fraga is another example of literature being performed in a chat environment.[64] In 2014, she reworked some of the leading questions and themes of Samuel Beckett's *Waiting for Godot* into a chat conversation between two people. The messages are written using appropriate modern syntax, including textspeak and emojis. She then recorded the results in a video. The tone and form are absolutely consistent and reflect a contemporary (in tone) private exchange between two people. The reembodiment is fragmented, vulgarized, and considerably reworked, yet the original piece is very much present and emerges between the lines and writing conventions of the chat.

These published forms and contexts allow for performative gestures in which classic literature can be used in terms of both content and form, and space is given to new formats and expressions. Then again, the potential performative qualities of the machine can go beyond the assumed forms and possibly perform like humans. Can the machine then be seen not only as a conditioning framework but also as a supportive writing system in its own right?

Authorial: This Chapter Might Have Been Written by a Machine

In 1987, Bernard Stiegler curated an exhibition at the Pompidou Centre in Paris entitled *Mémoires du futur,* about the future of reading, writing, and archiving. The French philosopher imagined that "the twenty-first century would be characterized by the proliferation of writing screens."[65] This proliferation is indeed happening in many ways: through the digitization of everything, through the mass-produced digital texts on social media platforms, in face-to-face interactions, and finally through the machines themselves populating screens with authorial texts. On social media platforms, users are pushed to write a significant number of texts every day to generate a response of even more texts, images, and connections, which inevitably piques the interest of business-related entities to conquer more customers. So, if we assume that these ecosystems are designed to have an ever-growing population of writing subjects, then their continuing growth-in-business models require an equally large growth in writers. We can observe a growing community of mostly invisible writing machines

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inhabiting them. By "writing machines" I mean a kind of software that is not necessarily recognized as such when you read its output, because it has learned to write in a way that, thanks to the algorithms involved, can be considered close enough to a certain human writing style.

These processes form a new industry based on the construction and acquisition of qualitative textual databases.

In this respect, the widespread digitization of everything has played a crucial role, used by both institutions and private companies to enhance their holdings of cultural assets. In terms of publications, and texts in particular, this process has gradually produced huge corpora based on qualified and professionally edited sources. These corpora, in their ethereal digital nature, are the essential material that can be processed by neural network–based software in the form of datasets, allowing them to compute trustable content. In particular, the sophisticated strategies that software corporations have used to develop specialized AI to establish new monopolies in strategic online services are still little known. Some of these are visible and include the massive scanning and indexing of the web by Google; the scanning of millions of books from libraries, again by Google; the use of a huge amount of anonymized data from proprietary devices, like Apple, Samsung, and others; and the huge amount of data produced on social media, like Facebook and Twitter. I would venture to speculate that anything in the digital cloud, or not strictly confined to our own local computer, might be indexed and, anonymized or not, could become part of a dataset stored somewhere. In general, the accumulation of a critical amount of contextualized textual content means the creation of valuable datasets that form meaningful *microworlds of sense* ready to generate compatible content through an appropriate algorithm. They should be both exhaustive and consistent, thus providing a universal reference: a microworld for that collection of meaning.

Solid plans for data acquisition and processing of datasets are then capitalized by algorithms, creating digital products and services that seem to be a tangible concretization of "semio-capital."[66] These semiotic artifacts are controlled by sophisticated algorithms, and humans are paradoxically provided as the final test reader, acknowledging their quality status as humanlike. They are based on the purest data that can be used:

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text formulated in a very basic digital structure in which each letter is linked to a number in the ASCII code and whose machine reading, on the other hand, links symbols directly to meanings, building on these dualistic relationships that make the data fully computable.

For all the industry's efforts to write automatically, from auto-generated messages to the witty responses of vocal assistants, we have no access to the code of the algorithms. There is a quality of *opaqueness* in these writing processes that is particularly persistent and recurrent. It forces us to abdicate the responsibility of understanding the processes behind the machine and its interface and to engage directly with the programmed styles and narratives. The technical dimension must be taken for granted, so we can only deal with the cultural dimension by simply adapting without appreciating any other element than the final text.

This opaqueness in texts that write themselves constitutes an element of oppression, as it implies that we delegate to someone else the decisions about the construction of the language we have to follow.

In fiction, there are historical precedents for the use of opaque writing machines to influence, or even manipulate, people's opinions and thoughts. The most famous is George Orwell's description in his celebrated and prescient novel *1984*, published in 1948. In this novel, "the Party," the elite that dominates and tightly controls the population, uses, among many other means, a "novel-writing machine" to create fiction, in order both to subjugate the masses and produce a substantial historical revisionism that erases public memory: "Julia [. . .] worked [. . .] on the novel-writing machines in the Fiction Department. [. . .] She could describe the whole process of composing a novel, from the general directive issued by the Planning Committee down to the final touching up by the Rewrite Squad."[67]

Here the generated literature comes from a totalitarian, state-controlled system, and the automatic text production perfectly manipulates the masses by default by also creating a consistent narrative that people can identify with. This opaque system has a machinic nature that is well hidden and inscrutable to the reader. In its readable results, it is frighteningly close to the stage that the current automatic production of text on an industrial scale might aspire to. And it suggests that opaqueness tends

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to be accepted the more texts are produced, and the more acceptable the results are to the human reader.

Industry protects the opaqueness of code as an important industrial asset, but in relation to the texts produced, we will never know if the creation of meaning is governed by hidden, unfathomable, but conditioning criteria. They seem to perpetuate the myth of an ideal algorithm using an infinite, or complete, corpus, feeding a machinelike formalized process. The whole will be perceived as a magical black box or the dream of an anthropomorphic writing machine. A classic example is the Electronic Bard, a creation by Stanisław Lem in the story "Trurl's Machine."[68] He tells of an extraordinary anthropomorphic poetry machine that overcomes all kinds of challenges and, after initial general amusement, devastates the poetry community until it is forced to relocate to another planet where it continues to work. This machine is the quintessential anthropomorphic dream: there is no human input, except for its initial fabrication, and then only wishes, which are systematically fulfilled with no flaws. The corpus and algorithm seem to have been amply absorbed and even exceed human complexity, with all the disruptive consequences. Lem writes: "in order to program a poetry machine, one would first have to repeat the entire universe from the beginning—or at least a good piece of it."[69] This expresses the dream of finally having a computer that can perform like a sophisticated human. This fantasy seems to have been triggered by the generation of machines of the 1960s and 1970s, which were available for the first time to an elite group of intellectuals through specialized technicians.

These imaginary technologies have capabilities that are highly productive, but they either lack the power to impress with pure originality or are so incomparable as to be almost supernatural. They are also vertical, or highly specialized, limiting the machine to one purpose in its anthropomorphic function. What they represent in both embodiments is our multilayered relationship to the machine itself, which we dream is an autonomous, humanlike entity. This relationship wants to produce an ever-new output, partly unpredictable, to surprise and challenge us, and keep our attention and interest.

Yet this kind of machine does not yet exist. The machines we use, despite their consolidated opaqueness, produce questionable results under stress. This is also embedded in the production of texts by industrial software.

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As all publications are now also produced digitally, even those originally conceived as print, writing practices have also gradually changed to be done almost exclusively through digital means.[70] These means are mostly based on software processes that define the boundaries of writing through their interfaces and functions.[71] We adapt to them as standards. Let's just think of the structure and interface of Microsoft Word and how most writers at all levels in the twenty-first century have adapted to its conventions, learned its features, and found workarounds for its flaws to make it work. Taken as a whole, it represents an almost universal and infrastructural set of tools that enables the production of texts with a new, increasingly authorial role.

A work of art that sums up this opacity with readability of results is the artist's book *AutoSummarize* by Jason Huff. He used Microsoft Word to summarize each of the top one hundred most downloaded copyright-free books in ten sentences.[72] His textual performance uses a standard software feature to ironically show the failure of code when it reaches its limits. The impossible task of automatically summarizing an entire work of fiction or nonfiction in such a short amount of structured text paves the way for failure and for the sometimes hilarious results. But it also demonstrates how the automatic tools make decisions that we have to trust in different contexts, taking the results for granted and their criteria for opaque, because they are written in proprietary code.

The tools that automatically help us produce texts are part of an *industrialization of writing* that has its founding basis in the *predictive paradigm*. Evolving from the plausible results obtained by exhausting the recombination of possibilities, the trustable results with stricter rules, and the involvement of an active audience, the degree of trustability is supposed to escalate to ambitiously achieve complete *authorial* results. But in natural language processing, the technology that aims to fully simulate human expression in writing and speaking, the predictive paradigm is a solid, unchanging technical approach. This paradigm has survived almost intact from Joseph Weizenbaum's 1966 *Eliza* software experiment,[73] an early natural language processing computer program that simulated a conversation between a human and a computer using "pattern matching" and substitution methodology, to today's industrial software based on machine learning.[74]

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Compare, for example, the spell checker T9, which has been used on mobile phones since the late 1990s and evolved into an operating system–wide spell checker in the late 2000s, to today's autocorrections in all popular digital writing programs and platforms.[75] Autocorrections were designed to automatically change words that appeared wrong while predicting the correct words and then, considering the context, anticipate the next word that is typed. In a way, this seems to realize the surrealists' technique of "automatic writing," theorized by André Breton in his essay *The Automatic Message,* as a way of writing not as a directed process but through a subconscious state and the spontaneity of thought, with all kinds of structural and meaning-related errors.[76]

The use of the autocorrect tool has undoubtedly influenced our writing at various levels, and early pattern matching models have evolved into predictions of what a particular user would write next. It follows the questionable principle that if a sufficiently complex machine is properly trained with a consistent set of data, for example, an author's entire body of work, which is the microworld of meaning, a mathematical model of that writing can be created to produce new "original" texts in the same style. The biggest ethical and methodological problem with this approach is that the machine does not know the meaning of the words it uses. This is the biggest fallacy, the main fault of which is not considering that the computer operates in the "universe of signals, not the universe of meaning."[77] For example, the causal or poetic associations and analogies in the original writing play no role in the mathematical model used instead to make the most accurate predictions about what might come next, taking into account the complex, calculated abstraction of what has been written up to that point; the uncapturable essence of that which we might perceive as "style."

This process parallels the history of computer technology rather than the development of philology. The evolution from small sets of stored words or phrases to large datasets (the history of databases) has paired the algorithms from recombining content within fixed structures to statistically weighting the context that can be inserted into a variety of structures, with high probability as the main criterion (the history of generative algorithms). I would argue that the paradigm of prediction has remained the same as the core principle of the whole system. In the beginning, attempts

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were made to predict new possible combinations, and now, thanks to larger corpora and faster machines, combinations are predicted that are mathematically consistent with what has been written before, just at a different level of accuracy.

The autoregressive language models, such as the GPTs (Generative Pretrained Transformers), work in the same way. They generate text starting from short or long input prompts, apparently without losing track of what it wrote about, while generating the output, keeping everything in context.[78]

This type of software is already used extensively and anonymously to write short news stories and reports that do not require as much commentary and lucubrations. But the extensive use of this software has two important consequences. First, the original sources are literally atomized, in other words, they are kept in order, but their causal construction is nullified to be used and then remixed, losing all meaningful references to the original context.[79] This systematic collapse of context, which seems to be a methodological prerequisite for the reusability of the original corpus, transforms the original complex writing process involving a number of different conceptual relations into a neutral matter, which is then edited to be even more neutral and impenetrable by statistics and chance.

The second consequence is to reduce writing to a statistically derived process. One of the main problems with this approach is that the generated conceptual flaws that arise in the process are increasingly overlooked because we are not trained to analyze this kind of writing. These flaws become pure glitches, and some of them have been defined as "Escher sentences,"[80] or sentences that make perfect sense at first glance but on closer inspection do not, and "world modelling errors," where the predictive approach produces syntactically and grammatically correct sentences but whose elements behave in an impossible way or are in a space/time where they simply cannot be.[81]

The result is occasionally a *hallucination of meaning* between the lines, or "nonintentional signals that move between absence and partial presence of meaning."[82] These incongruities are not easy to detect because there are two basic mechanisms at work in reading. The first is the principle of charity, which states that we should interpret a speaker's statement as rationally as possible, considering the best possible interpretation.

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Basically, it urges us to ascribe a rational interpretation to what we read, if we can quickly find a coherent one, and "it constrains the interpreter to maximize the truth or rationality in the subject's sayings."[83] The second mechanism is the "hermeneutic contract," or the engagement of the reader to assign authorial intention, with a perceived abstract contract with the author.[84] The former urges the reader to trust the author, because the trust is relatively instinctive, and assumes the author's ability to write. The latter is related to the confidential relationship established between the author and the reader, which is based on trust and genuine interest.

But the dissonant difference between the universe of symbols and that of meanings emerges in the predictive model with two major problems. The first is algorithmic bias. The records are the reference and the main source of information for these writing machines, shaping the results. On the one hand, there is a concrete danger of *data pollution* from the multitude of automatically generated credible texts entering the vast global reading arena. The algorithms should be educated, more than merely trained, and the datasets should be open, comprehensive, and public, as they are mainly meant to include historical data. A system using that data, "which reflects this or that flavour of injustice, will perpetuate that injustice."[85] The main risk is that we delegate our responsibility for awareness and understanding of the process or algorithm and knowledge of the corpus, which equally determine the outcome in its accuracy and meaning. We could agree with Delphine Bedel that "beauty is in the eye of the algorithm,"[86] but technically we are not delegating to the machine but to those who programmed and fed the data to the machine. We delegate to those who have constructed and prepared the machine for us.

Second, and structurally more relevant, is the reliance on a predictive mathematical model. The statistical approach proves that the machine is essentially unable to distinguish fiction from nonfiction, and that it is incapable of developing a causal thought based on the preceding ones. It has "amnesic qualities" that undermine the virtues of writing.[87] Moreover, the combination of privately developed datasets and the unilateral use of this paradigm risks creating a *literary monoculture*. In fact, the core statistical approach would still be looking for the most accurate prediction of writing in that context and at that time, based on all

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similar contexts that have occurred in the past, while the only significant change between different texts would be in the corpora used. But that would be like having a single ghostwriter for many different official authors because the basic mathematical mechanism, with all its weaknesses, is supposed to be universally valid. So in the rush to delegate and create commercial automatic writing machines what we might miss are the nuances of what is perceived almost unconsciously between the lines. A kind of biodiversity of our writing that could be as lost as the frequencies in low-rate MP3s or the nuances in the approximate dithering of low quality JPEGs. Cognitive studies of how we write reveal that it is a very complex and yet undetermined process, involving not only the areas of the brain that play a crucial role in speech and language but also many others that seem to have nothing to do with it.[88]

Moreover, to make mathematical representations of an author based on what has already been written one must take what has been done up to that point as the main source of inspiration. This approach ignores the possible external events that might influence the writing from that point on, even if the machine simulates a deceased author. It always seems to be a solid retrospective rather than a systemic approach and reflects a classical cybernetic rather than a contemporary approach. "Did Johannes Brahms write all the Brahms he could write?" asked Abraham A. Moles in 1965.[89]

But the main questions would be: How much of what we write is really predictable? And is our writing even computable before it is assessed as predictable? To find an answer to these questions, we should adopt a different perspective: writing with the machine, rather than developing a blind faith in autonomous writing machines.

Writing with the Machine: Machine as a Supportive System

The machine, seen as an autonomous entity that seamlessly produces text after proper instruction, is not the only approach to nonhuman writing. A technical and conceptual dialogue with the machine can lead to writing *with* it. Developing tools and the conducting of coding experiments are enabling the formation of a new kind of writer who uses algorithms to improve skills rather than delegating them to the machine.

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This is part of a dual, opposing vision: either to ascribe anthropomorphic properties to the machine and expect it to be our intellectual equal, or to see it as a different entity with a very different logic with which to engage in a potentially fruitful dialogue. We find traces of the latter in the early philosophers who used formal logic in conjunction with language. Llull and Leibniz, for example, did not dream of autonomous thinking machines as we seem to do today, but of "philosophical machines."[90] Llull's rotating paper discs were intended to help combine words in the form of questions answered by other words in the appropriate places.

Early literary experiments with electronic computers already tested this approach. After Ballardini decided to select and slightly adapt the poetic output in his "TAPE MARK 1," J. M. Coetzee, who received the Nobel Prize in 2003, used computers in a similar way. From 1962 to 1965, working as an IBM programmer using an Atlas 2 supercomputer, he wrote code after work to select words from a vocabulary to create poetic repetitive lines, which he defined as an "algorithm for the production of original metaphors."[91] This process produced long lists of words in a configuration that can now be equated with some experimental poems. They were printed out on continuous paper so that he could search among them for "the unexpectedness and originality of 'real' poetry."[92] Then, from the thousands of less interesting lines, he selected the few that were sparking new sense, and then edited them. Coetzee has already taken a clear position in this controversy: "A machine which produced original metaphors might have attention paid to it. A machine which produced imitations of traditional metrical patterns, however impeccable, would certainly be ignored."[93]

It is a specific supportive form that foregrounds the associations, and the induced combinatorial production is not meant to produce the final legible result, awarding again the process to a black box. Rather, it is meant to be instrumental, to inspire and set in motion the literary composition. And so he has written the code accordingly, in a process that generates original starting points rather than prefabricated poems.

It is not trivial to define literary machines, apart from the fact that they are dynamic systems with an algorithmic capacity to write. As early as 1967, Italo Calvino questioned the paradigm of the machine as literary "assembly line," which is what the predictive paradigm now conceptually produces: reassembling a corpus through a mathematical model that

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supposedly represents a writer's style.[94] But this assembly line seems to be guided more by technophilia and the resulting temptation to fully embrace the logic of the machine, with its questionable results, rather than literature, with its history of unpredictable changes and production of new paradigms and ideas. To conceive of the machine as a producer of original prompts, rather than feeding it with prompts expecting it to automatically generate a finished work, is to explore "machines that make us think" rather than "thinking machines."[95] This inspirational role is key to understanding the machine as a partner that can enrich a dialogue with its own logic and attitude. The machine could be seen as an alien subject offering unique perspectives in a peer-to-peer dialogue, among probably many that are seemingly indecipherable. Another concrete example is a small piece of software called Verbasizer,[96] developed in 1997 by iconic musician David Bowie together with Ty Roberts, CEO of Ion Music, who also produced Bowie's first CD-ROM in the same year. The program automatically breaks down a typed sentence into columns of words separated by type (nouns, adjectives, etc.), which can then be randomly rearranged into verses. The random associations that came out were quite unusual and served as a starting point for some of Bowie's song lyrics, using a similar methodology to Coetzee's generation of metaphors. The less predictable result then gains value by completely overturning the industrial principle and appreciating and embracing an unpredictable paradigm in place of the predictable.

The bespoke dialogue allows Bowie to write "with the machine" and enjoy its speed and different logic to achieve eccentric results. It is not easy to define this logic, but it clearly defies cliché and easily recognizable canon, and does so in unpredictable ways. Calvino promoted this kind of unpredictability, adding another crucial element of disorder: "The true literary machine will be one that itself feels the need to produce disorder, in response to its previous production of order."[97] This disorder can be equated with the subtle quality that then defines literariness, the recognizable but hardly definable unprecedented use of concepts, context, or language. What Calvino is calling for is definitely not the construction of machines that would pass the Turing test. On the contrary, they would display the same attitude to produce original results but retain an unpredictable character and disrupt tradition. What can be imagined under these conditions

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is an edition that not only reassures the reader with a recurring style and vision but puts him in a state of constant discovery and adaptation.

Potentially, and occasionally, serendipity can result from the dissonance of the combined originality, and sometimes eccentricity, of the calculated results. Jasia Reichardt defined "cybernetic serendipity," which she used as the name of her seminal 1968 exhibition, as being concerned "with possibilities rather than achievements."[98] These possibilities are usually hidden in the generated text. The imperfect results, sometimes naïve, sometimes inseparable from the man-made, even seeming alien, can occasionally be recognized as accidentally visionary or of outlandish beauty, especially in the case of extensive automatic production. Serendipity, in fact, does not represent a goal but a philosophical attitude toward the discovery of unexpected connections that produce knowledge. It structurally gives space to the possibilities of interpreting the unpredictable and finding meaning. In this sense, part of the machine-generated text can be seen as a trigger of the serendipity mechanism more than an end product. It is an intermediate cultural product intended to generate further thought.

Serendipity produces "accidental knowledge," possibly through errors or perceived errors. It is triggered without delegating the creation of meaning to the machine but, on the contrary, to stimulate us to find new meanings in its production. The underlying goal is to reject the concept of the machine perceived as an anthropomorphic substitute and to perceive it as an abstract extension and amplifier.

In this sense, the primary concept of defamiliarization helps to circumstantiate what the role of the machine might be. Coined by the theorist Viktor Shklovsky within Russian formalism, it defines how the "function of poetic art is to counteract the familiarisation encouraged by routine modes of perception."[99] So, while industry pushes us to blindly trust the machines and the information they process, a process of defamiliarization toward the paradigms and outcomes they propose can strategically help rewire our connection to them and welcome this disorder that could facilitate the creation and understanding of new, original knowledge.

This process could lead to a kind of *metapublishing* that does not aim to communicate directly but to activate the connection between the machine and what it can unpredictably produce as we elaborate. A prerequisite for activating this process is the transparency of the code, which allows the reader to understand and intervene in the elaboration. The

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machine is then a possible allied entity: it ceases to be an oracle with supposedly anthropomorphic properties and becomes a transparent tool that can elevate the writing to an unplanned path.

At a deeper technical level, the defamiliarization with industrial paradigms should be done at an infrastructural level, creating the resources and software to implement a different kind of useful, constructive, automatic writing, with the mechanisms behind it known. This approach would mean compiling and studying datasets for testing and writing programming code for text analysis and production, and sharing both publicly. The artistic research group Algolit, for example, is dedicated to these activities to help a writer write stories told from the perspective of an "algorithmic storyteller," systematically making the programming code public as a political gesture and agenda.[100] The machines with the code, and the data used, form their own publishing ecology in which they become allied metawriters. These metawriters are machines that cooperate with their own generated expertise while deeply questioning the authorship shared between the various datasets used, the code, and the free will of the human author who intervenes and builds upon the automatically generated texts. The algorithms written serve a kind of machine learning that is instrumental rather than predestined: the machines build the parts of the automatic composition to serve a more complex writing strategy. Their approach realizes a changing and diverse ecology of metapublishing that builds a reciprocal relationship with the writers. This is all possible because it is practiced through a collaborative effort that delves deeper into the workings of the machine and can individually master the production of texts. What emerges is a programmed symbiosis with the machine, a constant dialogue and focus on experimental production that does not focus on the predictive simulation of style and thus the anthropomorphic subjectivity of the author, which is instead the goal of the industry. The process constructs a hybrid territory in which the communication enabled can create a new meaning, with a "new kind of mesh of both machines and subjects."[101]

In the 1980s Calvino foresaw this possible scenario, with a disappearing author in the classical sense and a new person with expanded possibilities taking his place, "a person who will know that the author is a machine, and will know how this machine works."[102] It is important, then, to integrate the knowledge of the machine and make it part of, or

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FIGURE 2.6
Hard West Turn, by Nick Montfort, 2018. Cover by Nick Montfort, 2018.

contribute to, the new ecologies of publishing. A possible hybrid literary product may fuse the validating printed format with varying content that depends on external independent events. An example of this is *Hard West Turn*,[103] a novel that uses code to generate itself and its sources, to change its own elements during generation. Written by Nick Montfort, a scholar who has written several works using algorithms, it crystallizes the possibilities for meaningful use of the network in a classic printed work. The code searches sources such as Wikipedia for accounts of shootings that have recently occurred in the US and cleverly extracts individual elements such as words and full or partial sentences to combine with its own prose, which is to be regenerated and published annually.

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The updated sources dictate the changes here, which means that the product is always in tension with the present time. The unique substance of the novel is its connection with the machine and its generated fictional work, in which the reported nonfictional reality is embedded. The text only makes sense after reality has been recorded, and the distance between reality itself and fiction is considerably shortened by this process. More than that, reality here is authentically calculated to be part of the fiction, which becomes a processed mirror of reality. We can think of it as a system waiting to be activated. It is an evolving writing that incorporates computation and networked data into its materialization in a critical, if not political, way. It is the new content that intervenes in the story, whatever it is at that moment, and forms a singular published object. The sources and their data are essential to the story, which is designed and yet calculated around them. This project demonstrates a recurring and autonomous symbiosis between the machine, the author who can update the code at will, and the unknowing humans who update the external reference databases, which has a direct impact on the next new edition of the book. This work is one of the first real and legitimate examples of processual and hybrid publishing.[104]

The Algolit group and Nick Montfort promote the tactical use of the machine through their understanding, using the transparency of their processes as a compelling quality. They prove that what matters to create meaningful writing machines is not the reliability of the technology, or the abundance of sources, but the fruitful dialogue between the different actors, "the dialogue between the writer and the machine as well as the dialogue between the machine and the reader."[105] We could relate this kind of dialogue to the one that was at the heart of Llull's and Leibniz's practices with their philosophical machines. This dialogue, whether technical, conceptual, or both, initiates an unscripted path that leads to a collaborative commitment between the writer and the machine. An example along these lines is *Pharmako-AI*,[106] an experimental book that collects conversations between K Allado-McDowell and an autoregressive language model (GPT-3). The author does not test the predictive accuracy of the algorithm in combination with the corpus but enters into an open dialogue with the machine, focusing on a number of topics and using the book as an archival tool for their reflections. The procedure is that they type in one thousand to three thousand words, press the generate

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FIGURE 2.7
Pharmako-AI, by K Allado-McDowell, 2020. Cover art by Refik Anadol, reprinted with permission from Ignota.

button in the software interface, and then continue the reflections produced by the machine with further texts. They define this dialogue more as "musical improvisation,"[107] which, as in the previous examples, further illustrates the sense of cooperation and "mutual" inspiration that might underlie these practices. Allado-McDowell chooses to make minor changes, such as fixing grammatical or spelling errors, affirming the attitude of preserving the generated text without fetishizing it.

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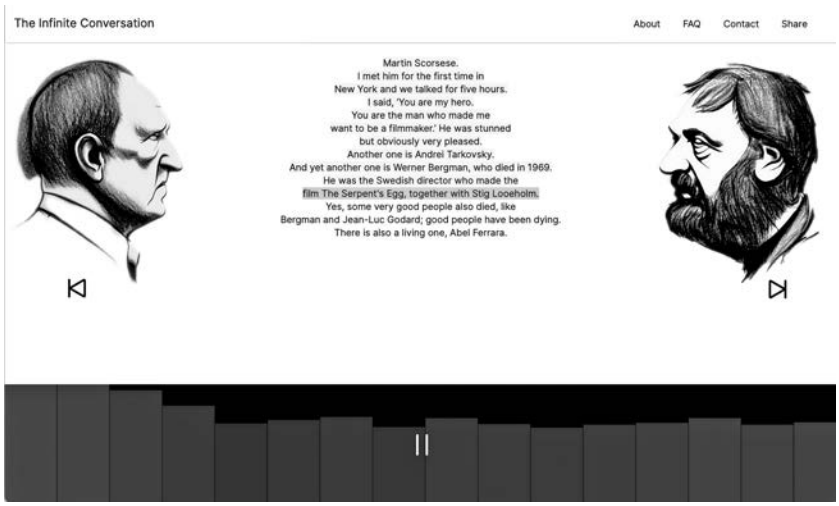
The Infinite Conversation website by Giacomo Miceli has a similar attitude to letting the machine, and the software behind it, speak, without any fetishism toward the produced results.[108] It creates a never-ending conversation between Bavarian director Werner Herzog and Slovenian philosopher Slavoj Žižek. On the website, the conversation is spoken through the effectively simulated voices of the two interlocutors while also displaying the transcription. The user starts to watch and listen at a random point in the conversation and can follow indefinitely. The form of the dialogue, which has no length or form established a priori, is the best premise to let the software generate a credible endless piece. It can transform and adapt to the different topic each of them goes into, with the machine using what they have written or said in the past. The relational nature of this work questions even more the precariousness of the authorial dimension, as the two simulated characters are not singularly expressing themselves but must relate to what the simulated other says.

Once we reach and escalate the authorial dimension, escalating the plausible and the trustable, there is no going back. Living with automatic authors inevitably means being aware of their presence and making use of their possibilities: jam sessions with natural language processing software could be an exercise that triggers a cycle of inspired writing that redefines


The Infinite Conversation
About
FAQ
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Share
Martin Scorsese.
I met him for the first time in
New York and we talked for five hours.
I said, 'You are my hero.
You are the man who made me
want to be a filmmaker.' He was stunned
but obviously very pleased.
Another one is Andrei Tarkovsky.
And yet another one is Werner Bergman, who died in 1969.
He was the Swedish director who made the
film The Serpent's Egg, together with Stig Looeholm.
Yes, some very good people also died, like
Bergman and Jean-Luc Godard; good people have been dying.
There is also a living one, Abel Ferrara.

Figure 2.8
The Infinite Conversation by Giacomo Miceli, 2022. Courtesy of the artist.

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the author's subjectivity or extends it to the machine part. Instead of the fantasy of an omnipotent machine, an overpowering magic black box that writes masterpieces in our style or theirs, resembling a singularity far from existing, we might reconsider the machine for what it is: an extremely powerful executor of abstract processes thanks to its outlandish computational capabilities, with an intrinsic logic largely alien to ours. The writing capacities that might emerge would allow the machine to serve as a partner in extending our competencies and abilities into directions we might not have considered, or as Moles opined in 1965, "as an amplifier of complexity so as to push our desires to their limits and to realize them."[109]

As automatic authors and writing machines become ubiquitous, there is a potential multiplication of machine-based ordinary authors. We are confronted with texts that gradually embed their machinic nature in a diachronic process. A tangible consequence of the postdigital condition is the blurring of boundaries between human and artificial subjectivities in writing, which manifests itself seamlessly in our pervasive digital spaces. But the practice of constructing digital systems, processes, and infrastructures to deal with these new subjectivities can become a political matter, imbuing choices with social consequences. This is important in an ongoing, contemporary, irreversible process: some initiatives aim to render the best written cultural production of thousands of years after it has been digitized and put it into a machine-digestible form to feed machines that provide a larger and better searchable knowledge base to humans themselves. Other initiatives, in turn, are nurturing machines to learn from this knowledge and develop machine-based services from it. In these mutually engaging situations, it is essential that criticism does not get lost in the processes and in the infinite number of results. Criticism can be properly elaborated when code and strategies are both transparent and assessable. The 'pervasive partnership' of programming code and language, and the accompanying quantification of language structures, has an intrinsic risk of *normalization of language* by producing an artificial writing that could weaken our ability to create ever new linguistic forms, structures, and associations over time if it is not instead nurtured by finding a noncompliant relationship with the machine that instead stimulates and amplifies our faculties.

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3

Activist Post-Truth Publishing

Manipulative Publishing in the Era of Uncertainty

We live in times of deep technical crisis for authorship and truthfulness. The endless possibilities for manipulation offered by ephemeral digital media will not stop evolving, relying mainly on increasing computing power and smarter algorithms. Among the first official acknowledgments of these manipulations was the verb "to photoshop" (to digitally alter a photographic image using Photoshop software), which was added to the *Oxford English Dictionary* in 2006.[1] Since then, credible digital manipulations are no longer limited to altering already existing images. Technological improvements mean that algorithms can create portraits that are almost indistinguishable from real portraits, but they simply do not exist. And fake, but realistic, voice simulations created by voice mapping techniques produce believable audio statements that never happened. Finally, deepfake videos, in which parts of an existing footage, typically a face, are mapped over another, have become believable documentation of events in which the participants never took part. Ten years later, in 2016, the *Oxford English Dictionary* included the term "post-truth" as "word of the year."[2] The combination of different media, image, voice, and video carries a threatening, profound potential for manipulation, especially when used in conjunction with social media. Here the propensity for virally trusted content is driven more by popularity than the credibility of the source.

The manipulation of photographs began shortly after photography was used for propaganda purposes and became mostly a tool of established

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power, while fake printed publications took an opposite trajectory.[3] They were produced as a subversive strategy to resist the normalizing forces of mass media employed by power, especially through the key popular form of newspapers, which I will analyze later.

After the paradigm shift imposed by social media, where everyone could be a publisher, including the machines, information intake has become an effective tool for mass manipulation. The immediacy of instant publication in social media, together with specific communication strategies, has led companies like Cambridge Analytica to develop manipulative tactics that change the ratio of *emotions versus facts* and dramatically affect people's habits of seeking information. People's *cognitive bias,* the systematic pattern of deviation from rationality in judgment, has been disproportionately fed by these tactics as they are exposed to fake information through a plethora of compatible, artificially created channels.[4] The *orchestrated noise* of a programmed flood of nuanced but one-sided opinions has, through the exclusion of scientific facts and information, obscured the possibility of fair information, which I do not believe I am being too hasty in calling "induced censorship."[5] The overriding of emotion and the silencing of facts, usually accompanied by the construction of false facts, creates this inescapable noise that is all-encompassing and causes our cognitive faculties to deviate from rationality.

The trust in the involved sources and the immediacy of real-time feedback on which social media is based have challenged the historical validation quality of print. Attempts are being made to replace it with technological validation systems, such as blockchain, by handing over responsibility for certifying content to the machine.

But the main assumption, again applying the principle of charity, has remained the same over time: if a piece of information has a credible form and narrative, it will be accepted first and recognized as legitimate right after.

Unlike a purely visual fake, which stages tangible, almost living proof of a *truth* and appeals to our ability to acknowledge a visual composition, the publishing fake appeals to the *plausible* and *imaginary*. It creates a narrative that can be understood and placed within what we consider contemporary reality or accepted history.

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Forbidden Publishing

To contextualize the dynamics of post-truth, and of its subtly induced censorship, it would be worth reconstructing a few cases of counterstrategies that attempt to liberate information restricted by different types of authority. They demonstrate how censorship polarizes two divergent attitudes: *concealing versus revealing*. In other words, excluding people from accessing some information versus including it. In totalitarian regimes every act of publishing is controlled and eventually censored if evaluated as potentially dangerous. Historically, lists of prohibited books, and printed matter in general, have been compiled and implemented by different regimes: from *The Index Librorum Prohibitorum* (Latin for *Index of Forbidden Books*) published in 1559, listing works forbidden by Roman Catholic church authority,[6] to the current list of books still banned for various reasons by governments from around the world.[7] Beyond the executive prohibition of availability through distribution, libraries, or import, there have been plenty of public burnings of publications over the centuries, trying to go beyond the access ban to completely destroy access to their content. Even limiting examples to contemporaneity, we go from the tens of thousands of books and documents burned in the streets by the Nazis during a nationwide campaign in 1933, to the destruction of the library of Mosul and its thousands of historical and rare old texts by Da'esh in 2015. These acts aimed to stigmatize the mere existence of the destroyed information and the pretended evil that it should have induced, so they were staged in public and publicized through the press.

The nature of a prohibited content is determined by what is attributed to its content and by the assigned limits of its circulation. These limits can be ideological, as in the previous examples; purely legal, such as compliance with a court ruling; or economic, such as protecting the profit generated by copyright protection. But they inevitably have political consequences when access to a publication is blocked. The subversive tactics used to reclaim access to censored information aims to overcome these imposed restrictions. Actions are used that often combine the technical means of producing and reproducing content with the creation of a liberatory social space.

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FIGURE 3.1A
Marta Minujín, *El Partenón de libros* (*The Parthenon of Books*), 1983, installation, Avenida 9 de Julio, Buenos Aires. Photo: Marta Minujín Archive.

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FIGURE 3.1B
Marta Minujín, *El Partenón de libros* (*The Parthenon of Books*), 1983, installation, Avenida 9 de Julio, Buenos Aires. Photo: Marta Minujín Archive.

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A clear example of this tactic is *The Parthenon of Books*, a work by Argentinian artist Marta Minujín.[8] In 1983, immediately after the demise of the military dictatorship in her country (1976–1983), she built a replica of the Athens Parthenon, whose columns, friezes, and pediments were completely covered with twenty thousand books, among those that had been banned by the military junta that ruled the country. She then called on the public to dismantle the work and appropriate the books. The artist's action creates a dynamic of collective consciousness by first collecting the books, with their monumental presence and the personal and official history behind their respective contents, and then redistributing them for free to practice a collective lifting of censorship. It restores the public dimension of books and makes them accessible again. The ideas contained in the publications are then passed on unchanged to circulate freely.

This performative artwork resonates with another strategy that, like most strategies to combat censorship, has been carried out collectively. Since the late 2000s, WikiLeaks has been the most famous, and dramatic, case of a leak of sensitive information. Julian Assange (the founder), Chelsea Manning, and Edward Snowden have leaked secret or classified information to the public after collecting and uploading it anonymously through the online platform. But they have dramatically become known to a wider public after giving access to famous newspapers such as the *Guardian*, the *New York Times*, and *Der Spiegel*. This is part of a tactic that considers the different role and weight of the respective media, digital and print. On the one hand, the online platform guaranteed that those who sent information would remain anonymous and that it could share sensitive documents from virtually anywhere in the world. On the other hand, the major newspapers, to some extent, acknowledged WikiLeaks's authenticity through the work of the editors involved, mediating between the technical language of the documents and the accessible language that newspapers must be made of. The information distributed was carefully selected and had the quality of revealing content that had clearly never been published or documented elsewhere before, that is, exclusive relevant content that is most valued by the newspapers.

These tactics of dissemination are part of the struggle against censorship, which seeks to prevent dissemination itself completely. And these tactics must be balanced between the online and printed mediums to do

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their job. *The Parthenon of Books* and the selected WikiLeaks documents can be described in technical metaphors as similar processes: they first go through a restricted access protocol (a kind of temporary encryption), then were opened (decrypted) and made publicly available. The balance between these encryption and decryption processes was handled differently in several cases.

In the case of walser.php,[9] the balance was on the digital aspect. It was a script written in the computer language Perl and published by the website textz.com. When executed, it produces a text version of the novel *Tod eines Kritikers* (*Death of a Critic*) by the German novelist Martin Walser. When it was published in 2002, the novel caused controversy because of its alleged antisemitic language, triggering widespread debate in the national, and international media. Soon after publication, textz.com posted the promotional pdf file and shortly afterward received a cease and desist letter from the lawyers of the Suhrkamp publishing house, which also reached those who facilitated the distribution of the digital copies at some level. The script cannot be considered the equivalent of the novel unless it is executed. Readers were therefore advised to obtain written permission from the original publisher before executing the script, which was largely ignored.

In constructing a protective environment, a digitally encoded shell around an original text, especially when it is controversial, authors use the fundamental property of the digital to calculate the outputs as a dynamic publishing feature. Every text is technically calculated before it is displayed, but here computation becomes another layer between the encoding of the digital format and the decoded readable content. It creates an intermediate form that can only be understood by the machine, and its transformation from the encoded to the readable state is a transitory form of digital publishing that transcends the standards and codes of publishing that have been in place until now. The technical dimension is used to obfuscate the sensitive content and legally play with its form.

The challenge posed by the evolution of possible digital forms of publishing concerns copyright since digital technologies have been based on calculating and copying information since the von Neumann architecture. This is the essential reason why in the digital dimension there is a complete manipulability of information that is reduced to computable

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primary elements: numbers representing characters, pixels, and so on. This means that both *complete manipulability* and the *end of copyright* are a technical de facto. The only way to reverse this status is to create new technical superstructures that limit these basic and founding functionalities, such as the blockchain.

As we have already seen, mere digital copying and sharing can become a bold political gesture when the content is particularly problematic, but it can build a more tangible presence when traditional media are involved. In a similarly bold gesture, computer programmer and activist Aaron Swartz downloaded and shared 2.7 million copyrighted and very expensive academic publications from the online academic service JSTOR, which lead to his arrest and the threat of a possible $1 million fine and several years in prison. He died by suicide in 2013 at the age of 26.[10] The transfer and acquisition of this information was entirely digital, and the act was intended to give the illegally downloaded knowledge the value of being shared with those who did not have access to it for economic reasons, such as universities in developing countries, contrasting with what Swartz probably considered "economical censorship."

Kenneth Goldsmith committed to honor Swartz's vision with a public installation at the Kunsthalle Düsseldorf. He printed 230,000 pages from a torrent file of 18,592 scientific publications totalling 33 GB, all from Philosophical Transactions of the Royal Society.[11] This file was legally obtained by Greg Maxwell from JSTOR and distributed with an explanation reflecting Swartz's thoughts. Goldsmith's subversive use of print as an archive for unauthorized digital information is an organized, deliberately performative gesture and uses the medium in one intricately illegal way, rendering it into a tactile artwork. The tactic of printing a single but tangible copy and encapsulating it in the safe territory of an art environment materializes the original gesture and enables collective sharing through the exhibition.

The boundaries of legal sharing of information blur once the information is digitized, while its physical embodiment makes it present, large, and tangible, but both have the potential to disarrange a system. In the anonymously authored *Contacts*, "after ten years of excessive networks," a printed selection of business cards of key decision-makers in art, media, politics, and culture was made accessible to the public.[12] This strategic

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leak of privacy shows how a traditional publishing format can transform the content and its value. Reproductions of private business cards change their status from personal exchanges, limited to trusted individuals, to borderless access. This access exposes sensitive data such as names, positions, personal email addresses, and phone numbers of people with relevant status, through the simple act of duplicating what was originally a private medium into a public medium (a small book) with greater access and distribution. The tactic here is specific to the medium and the content and completely excludes the online dimension that would make the dissemination overly extensive. But limited duplication still breaks the original distribution system, undermines the hierarchies of power and the economics of face-to-face contact, and unleashes the intrinsic economic value of unpublished information.

Every human recipient of this disputed information bears the responsibility to pass it on or not. And so, copyright, as well as privacy and social protocols, can be easily overcome because the technical possibilities of copying and publishing, combined or disjointed, are manifold. The idea of using systems as databases and archives, whether public, industrial, or personal, to edit contextual and relevant items and disseminate them through a publishing process has been practiced by activists and artists for decades. This work has shown that it is possible to disrupt a hierarchical system, but also demonstrates the social consequences of technically mastering the disclosure of important information that was previously restricted or forbidden.

Newspaper Fakes during and after World War II

The production of fake newspaper front pages and their distribution to attract public attention is a remarkably old practice dating back to the end of the nineteenth century, if only in the form of repurposed advertising leaflets.[13] But the deliberate use of fakes as a political strategy to manifest an ironic rebellion against the status quo is a more recent tactic that manifested during World War II. In particular, the resistance movements against the Nazis used newspapers as a counterpropaganda medium, with underground printers, mobile mimeographs, and clandestine collective distribution of copies. The newspaper format was the highest standard for

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this type of publication, as it was generally accepted and had the property of disguising political content in an authoritative form. For example, in July 1943, during the Nazi occupation of Poland, a fake edition of the newspaper *Goniec Krakowski* was printed in Krakow, in response to an official edition in which the Nazis printed a list of all Polish victims of a Soviet massacre. The fake paper included a counter list of those murdered by the Nazi Party.[14] Also, the famous *Le Faux Soir* was a spoof issue of the major Belgian newspaper *Le Soir* published on November 9, 1943, by the Front de l'Indépendance, a Belgian resistance organization.[15] It used humor and derision against the Nazi occupiers with the major headline "Capitulation Without Conditions," which reported on a conference in Berlin where all countries involved in the conflict would lay down their arms. It ended with a quote from Adolf Hitler's *Mein Kampf*: "Blood and tears will make the future's harvest grow." Other sections of the paper showed Europe as one country, with freedom of movement. There were also previews of imaginary upcoming films such as "The Air Devils" or "Corpses Fabric."[16]

Douleurs terribles dans les membres.

LE SOIR

Hôtel des Ventes Bruxellois 48 CHAUSSÉE D'ANVERS 48 BRUXELLES-NORD-T. 17.69.90 48 RICHE VENTE PUBLIQUE SPECIALE

60 Cmes

Mardi 9 novembre 1943

17 HEURES

EN PLEINE ACTION

La Conférence de « Capitulation sans conditions » Berlin

Stratégie Efficace

Berlin admet que la situation est des plus sérieuses.

ANNIVERSAIRE

UN DOCUMENT

Communiqué allemand

LA SEMAINE INTERNATIONALE

Du décrochage à la victoire défensive

UN FAIT PAR JOUR entre 1000

FIGURE 3.2
Le Faux Soir, November 9, 1943.

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These early fake newspapers define the status of the medium: a reappropriated space of communication liberating information in a familiar and authoritative form. The two different strategies, counter-information and satire, both target the state of oppression and offer an exit strategy for the collective imagination. The newspaper header and graphic design are the guarantee of the reliability of the printed information.

Various fake newspapers were printed by the US Civil Defense Council in the early years of the Cold War, between 1952 and 1953. They issued some test emergency newspaper editions to test the possible materialization and media impact of an atomic bomb explosion in the US. They used various lesser-known front pages like the *Daily Times* or *Buffalo Evening News* with an accurate layout. The big, terrifying headlines were quite similar: "230,000 Killed as A-bomb Hits Bronx," "A-Bomb Destroys Downtown Buffalo, 40,000 Killed," "Final Edition," and so on. But even keeping the consistency of the main structure with articles and pictures, a smaller section on the front page already revealed the strategy and clarified it with short headlines like "It Could Happen—But Didn't."[17]

This social experiment, which plays with the narrative of a supposedly deadly threat becoming near and real, is overwhelming and dominates the visual layout of the front page. The panicked tone draws the reader's full attention, and it takes a while to notice the clues explaining the visual illusion.

As in the earlier examples, the imaginary becomes real in the visual layout of the front page. The reader is projected into another hypothetical time in the future, which is mistakenly perceived as the present because it fits this specific tension in the public imaginary.

Il Male: Newspaper Fakes in the 1970s

The practice of producing fake newspapers, taking advantage of their standard form and capacity, was adopted by artists and activists throughout the twentieth century.

We should consider how the modern visual form of newspapers, still one of the most easily identifiable types of publication, has changed little since the nineteenth century, apart from the gradual inclusion of images and the use of color. The newspaper has established itself as a

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daily medium over several generations and, with its specific surface, has become an aesthetic standard and a defined cultural object with its specific interface. I would argue that newspaper covers were Instagrammable before Instagram was invented, as they visually condense an attractive balance of current content. The newspaper cover is a frozen image of a rigorous selection from a whole day of news, a visual and verbal synthesis of a day of events. It condenses a synthesis of the most important facts from the outside world that arguably concern us, in a limited space, with a recognizable ratio and intrinsic authoritativeness. So creating a fake newspaper undermines the spontaneous trust and attraction we have for this particular medium.

For this reason, artists have often used newspapers as both identifiable information environments and daily commodities, from Andy Warhol's *Headlines* series of monumental reproductions of particularly dramatic front pages frozen in time,[18] to Sarah Charlesworth's *Modern History* series, which tracks the use of the same image on different newspaper front pages.[19] But a specific conceptual manipulation of newspapers and the conventional ecosystem surrounding them has been used by artists and activists to promote certain ideas through the fake.

Learning over the years from art movements such as Fluxus, Situationism, and Lettrism and developing a new way of looking at the media, groups belonging to the Autonomia Creativa (Creative Autonomism) movement in Italy carried out campaigns in 1977 with fake journalistic scoops in newspaper form. This movement experimented inventively with different media to make them accessible to the public and to disseminate them. Il Male (The Evil) was a small galaxy of underground groups that played with the attitude of publishing.[20] Their group was named after the magazine they published together. It was run by one of its founders, Vincenzo Sparagna, and produced fake newspapers that ranged from mere front pages to full, carefully designed copies. The content tone was in between the plausible and the surreal, perfectly reflecting the social and political changes of the 1970s. Headlines included "Lo stato si è estinto" ("The state is extinct"), which was an announcement of an alien landing, and the arrest of a famous comic actor (Ugo Tognazzi) who turned out to be the leader of the most famous terrorist group, Brigate Rosse (Red Brigades). The latter action was backed up by real photos of the sympathetic

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actor and the fake police and was reproduced in the layouts of three different major newspapers: *Il Giorno*, *La Stampa*, and *Paese Sera*. Often these newspapers were exposed by kiosk owners who spontaneously became accomplices in the crime. This led sometimes to quite harsh reactions from customers and passersby, and to passionate discussions on the street and in various social spaces. This social experiment led to the bar being raised higher and higher, to the point of being a "fake/true, or true/fake newspaper." Sparagna admitted that "the more we wrote big 'lies,' the more we discovered that they were elliptical forms of reality, less false than many current commentaries."[21] He also commented on the pure level of communication and abstracted this quite emotional practice: "I discovered that once reality is reduced to communication, it was possible to modify it changing the modes and content of communication."[22]

The same group was also involved in other publications of this kind. In 1979, a fake issue of *Trybuna Ludu*, the official media organ of the Polish United Workers' Party, was circulated in Poland. It was distributed during the visit of Pope John Paul II (Karol Wojtyła) to his homeland and carried the headline "Government Resigns, Wojtyła Crowned King."[23] In 1980, a fake *Pravda* newspaper was distributed in Russia with the headline "RUSSIA OVERCOMES THE DEMONS, No Union, no Socialist, no Soviet, only Republics."[24]And finally, in 1983, with the same local support, a fake *Krasnaya Zvezda* (*Red Star*), the official newspaper of the Soviet Ministry of Defense, was distributed in Kabul and in East Berlin, with a classic "War is over! All go home!"[25] The latter newspaper was distributed in the theater of war to dissidents of both factions, in a highly risky operation that revived the spirit of the earlier underground press that had worked during World War II, traveled internationally, and teamed up with local supporters. The personnel and logistical infrastructure were strategically laid out both at home, especially with lawyers, and abroad to avoid being arrested or having the newspapers confiscated before they were distributed.

These actions seemed to perfectly embody the statement on the cover of the Italian political magazine *A/Traverso*, cofounded by philosopher Franco "Bifo" Berardi: "false information that produces real events."[26]

In the preglobalized and predigital society, fake newspapers created a different and mediated social space in which the physical, and sometimes

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PAESE SERA

notte

Giovedì 3 maggio 1979 — Anno XXX - Numero 108 - L. 250

«Dal pizzimonio al cucuccio»

L'ultimo farneticante saggio di Tognazzi

Allegria fra gli automomi

Negri attende la scarcerazione

Una dichiarazione di Pecchioli

Era ora! Si è fatta luce

ARRESTATO UGO TOGNAZZI

E' il capo delle BR

Anche Vianello nella direzione strategica: cinquecento carabinieri gli danno la caccia. Finto lo scioglimento della coppia ai tempi di "Un due tre». Da dietro le quinte dirigevano il movimento eversivo. Ampia retata negli ambienti dei comici. Le congratulazioni di Pertini

Quando la comicità diventa eversione

di Aniello Coppola

«Mi dichiaro prigioniero politico»

Il popolare attore catturato nella sua villa di Velletri, all'interno di un frigorifero. Sequestro materiale «di estremo interesse»

NOSTRO SERVIZIO

Vianello: «è pazzo ma lo perdono»

Tognazzi viene ammanettato e portato di forza: il cap. Cornacchia (in borghese) sorride per il successo dell'operazione.

FIGURE 3.3
Paese Sera—Tognazzi capo BR—*Il Male* n.17, 8 Maggio 1979.

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clandestine, presence in the exchange of information was reminiscent of the word of mouth typical of oral culture. The outraged commenters needed a presence and had limited time and space to express themselves, which also allowed for the richness of in person communication, with voice, gestures, facial expressions, posture, and other forms of interactions. Italian passersby, but also Polish activists and Russian dissidents, were part of the space of debate, and their previous perceptions of reality were challenged.

Yes Men: Fake Newspapers in the New Millennium

In the late 2000s, in a very different world where there were no barriers to global communication, another group of activists/artists used the newspaper form for a series of actions over a period of years. The same urge to instigate public opinion and manifest it by confronting a public imagination was put into action. But in this radically changed scenario, technologies were essential to create an attractive space for publishing, and consequently reading, amidst the growing jungle of screens.

The Yes Men (Jacques Servin and Igor Vamos), a culture jamming activist duo with a remarkable history of clamorous actions, created their first, technically flawless, fake newspaper with another great headline about the end of war: "IRAQ WAR ENDS." This was the *New York Times Special Edition*, created in collaboration with Steve Lambert and The Anti-Advertising Agency.[27] They coordinated a large effort to print and distribute what they claimed were hundreds of thousands of copies of this fake *New York Times Special Edition* in New York City on November 12, 2008, but the newspaper was dated July 4, 2009, a few months in the future, in a subtly played anachronism, and it featured front-page news stories that embodied a spirit of radical change in several respects, such as "Minimum Wage Law Succeeds" and "Nationalized Oil To Fund Climate Change Efforts." These edgy titles and articles were almost plausible after the enthusiasm generated by the election of Barack Obama as US president. The layout of the *New York Times* was meticulously recreated with digital tools, down to the smallest typographic details and fonts. Some of the recurring corporate ads were also reproduced, but satirically altered to aesthetically deceive the casual reader. Through an internal mailing list, an extensive network of volunteers was mobilized to distribute the paper

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for free around the city, even in front of the *New York Times* headquarters, without any legal consequences.

Compared to the initiatives of the past decades, the degree of reality simulation in this printed object had reached an unprecedented precision. The public imaginary is extensively unfolded in an entire newspaper, assembling a balanced collection of desires and credible strategies to realize them. The newspaper as a medium becomes a manifesto of collective hopes rendered through a system of imaginary messages.

The duo created a new newspaper in 2009 that was a forgery of the *New York Post* with the headline "We're Screwed" (about climate change), but here they reverse engineered the previously constructed mechanism. All the articles were completely authentic with a careful fact-checking made by editors and climate change experts. The choice of the *New York Post*, one of the major climate change denial news agencies, was of course strategic and generated a constant tension between form and content, a tension in the consolidated identity of the newspaper, evident in the identical design, style, fake status, authenticity, and accuracy of the articles. Once again, the newspaper's acknowledged status was being conceptually hijacked to serve a different political purpose.

In 2009, some similarly accurate activist forgeries were produced by sympathizing or collaborating groups: an edition of the *Financial Times* in London, one of Die *Zeit* in Germany, and an edition of the *International Herald Tribune* in Copenhagen.[28]

We can see the influence of this work in the fake *Boston Globe* front page produced by the newspaper itself on April 10, 2016. They made a short video of a fake printed front page that was also distributed in pdf format, as with the Yes Men's fakes, a year later, with the main headline "Deportations to Begin" reflecting a series of shocking statements by then US president Donald Trump, which quickly went viral online.[29]

The *Boston Globe* fake is like a prelude to the later Yes Men newspaper published on January 16, 2019. Using a similar strategy and standards, they produced a fake *Washington Post*, again labeled as a special edition with the rewritten tagline "Democracy Awakens in Action," instead of the official "Democracy Dies in Darkness."[30] Not by accident, the official newspaper was among the few that constantly fact-checked Trump's statements and attacked him as a "serial liar,"[31] calculating an average

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The Washington Post

Special Edition

Democracy Awakens in Action

MAY DAY • WEDNESDAY, MAY 1, 2019 • FREE

UNPRESIDENTED

TRUMP HASTILY DEPARTS WHITE HOUSE, ENDING CRISIS

Celebrations break out worldwide as Trump era ends

Entire globe breathes sigh of relief at end of dark period

BY SARA GABRIEL RAMOS

Former President Trump slips into a private car in the wee hours of the morning.

Pres. Pence begins 'clipped duck' term

New president starts term 'Penced In' by predecessor's embarrassing reign of failure and crime

BY ELOUISE LEWIS

President Pence at his hurried swearing in.

"BLAME CROOKED HILLARY & HFIOR"

Surge of protests proves too much for Trump

BY LISA CHUNG

From #MeToo to 'You're Fired'

"Finally," say women

BY SIMONE WILLIAMSON

The actions that turned the tide

Women took the lead in ousting Trump

BY FRANCESCA LU

Top: Teenagers used dresses to blockade offices. Bottom: Americans flooded the streets nationwide.

How DC stepped up to shut down Trump

BY ALEXIS BERRYHILL

Momentum builds for progressive package of bills

Commemorative reprint of the Arkon Guide that helped bring down Trump

How to steal a base: Progressive pressure can prevent new Trumps

FIGURE 3.4

Unpresidented The Washington Post by The Yes Men with Onnesha Roychoudhuri and L. A. Kauffman, 2019.

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of eight lies per day.[32] The fake newspaper, coauthored by L. A. Kauffman and Onnesha Roychoudhuri, carried the headline, "Unpresidented: Trump Hastily Departs White House Ending Crisis," surrounded by articles and reportage on how it came to be. It was distributed in thousands of copies to commuters in Washington, DC, and was also dated a few months later, on May 1, 2019. The nature of the action is revealed in the same newspaper in the article "Fictional Washington Post eerily predicted real events ." The other articles dealt with precise dates and facts, looking at them from a near future perspective and giving a sense of a nonconformist but possible reality.

The success of these actions was additionally due to the online distribution of the material, especially as a pdf file, and the front-page image. The final shift to mass and instant dissemination via online social media was already underway. Moreover, the constructed system creates a present publication space, written in a near future but shifted by only a few months, unlike what usually happens in science fiction. This time gap is crucial because the gap it works into is short enough to be filled with a little imaginative effort. It allows the reader to project themselves into it as if it were the present, almost seamlessly. The tension between the potential near future and the present offers the possibility of being resolved through action.

The timing of a fake is crucial so that it can be fully absorbed and remembered. The imaginary in the fakes can end up colliding with reality, or shaping it in advance, if you engage with it and make the imaginary an agenda. The Yes Men produce "prefigurative interventions" by engaging in an imaginative exercise that designs a possible future deeply rooted in the present.[33] Their "mischief to reveal truth" cites the work of the famous hoaxer Alan Abel, who admittedly inspired them greatly.[34]

The fakes in print embody the postdigital state of print as the complete manipulability of the digital makes a fully manipulated newspaper a work of art. They have a strong political value: they are not ephemeral and not in a series of uncatchable waves, as is the case with online fakes and especially online post-truth strategies.

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The News Form and the Importance of the Framework

The complete programmability of the digital, even more so in the calculated and served scheme of web function, was quickly understood as the fabric of the object published online. As a result, publication and institutional forgeries flourished on the Internet from the beginning, inspiring a whole range of online artworks over the years that manipulated official graphic templates with different purposes and approaches. But one particular artwork addressed these technical possibilities of effectively manipulating the content of online news: *Newstweek* by Julian Oliver and Danja Vasiliev, created in 2011.[35] They took the concept of digital faking to a new level by using a homemade Internet router in public places with Wi-Fi. It took control of Internet traffic in real time, including web pages, which they could change before they were displayed on nearby computers. They specifically targeted the content of popular newspaper websites, changing titles, images, and text, with understandable emotional reactions from bystanders. Compared to the actions in printed newspapers, this once again changes the time and space of publishing and using information. The space of the original online structure, the framework, is hijacked locally, proving the ephemeral and transient nature of online content, which is technically open to potential complete manipulation. It also proves that this manipulation can occur at any point in time, even immediately before the page is displayed on our devices. This deeply challenges the very concept of publishing, a trustable and unchanging medium, as it has been consolidated over centuries and still resonates in the authoritative brands of newspapers.

Further exploitation of this concept can be found in the online counterpart of the fake newspaper tradition, which has proved equally effective and popular and has achieved an acknowledged definition of fictional news, although it is mostly aimed at pure satire. The *Onion* is among the earliest and most established websites of its kind, focusing primarily on US content, particularly mainstream corporate news in web and TV formats.[36] A European network of fictional news sites operates regularly: *Lercio* in Italy,[37] echoing the tradition of *Il Male*; *Le Gorafi* in France,[38] whose name is an anagram of Le Figaro; *El Mundo Today* in Spain;[39] and *De Speld*

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in the Netherlands,[40] to name a few. They all consolidate the practice of fakery in the form of carefully crafted headlines and texts where the irony is usually prominent and quite identifiable but which also often generate viral circulation on social networks with very concerned comments from people who trust the content as true. They often contain an increasingly teasing tone like the clickbait pejorative style that has also permeated traditional media in its online incarnations, maximizing the role of titles as gateways to content and producers of economically valuable page views. As Ryan Bishop and John W. P. Phillips affirmed, "the title is the first and most apparent of all textual devices that partake of, while also constructing, the knowledge apparatus."[41]

The system created by contemporary online fakes can also be seen as a test bed for plausibility, social validation, and, ultimately, trust in speculative news. In online fakes the public imagination resonates through the network, with the original message echoing unpredictably in distant or unrelated contexts and backgrounds, usually only through the title and an image.

The chosen narrative is disruptive and has a higher potential for persuasion. Umberto Eco, who debated historical forgeries such as the *Donation of Constantine*, wrote that "everyday or historical reality [. . .] is far more complex. [. . .] False tales are first of all, tales, and tales, like myths, are always persuasive."[42]

The narrative or story that emerges from the combination of its essential elements, a title, a text, and possibly an image, needs an appropriate framework to be acknowledged, as all news does. The framework of a journal was used, for example, for the first issue of the surrealist magazine *La Révolution Surréaliste*, which was visually modeled on the conservative scientific magazine *La Nature,* and enticed the reader to read the controversial content of the surrealists' magazine rather than rigorous scientific elaborations.[43] The framework of a commercial magazine was instead used by Álvaro Carmona when he reedited the Spanish January 2016 issue of *Cosmopolitan*, replacing every word with passages from Adolf Hitler's *Mein Kampf,*[44] leaving the original layout and photos untouched in a meticulous process. Carmona's aim was to criticize the totalitarian values that these kinds of magazines dictate to women and use to indoctrinate them into gender roles. These two examples span almost a century but are linked

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by the disconnection between the text and format, creating a conflict of meaning that is not immediately perceptible visually. They literally occupy an established format that is recognizable in its original scope and style. The reading experience then transforms from a consistent flow to a tension between form and content. This tension emerges the more the publication is experienced, and so the framework is revealed.

Finally, there are also fake publications that construct their own framework in the style of a particular genre. The *TBD Catalog*, for example, is a product of "design fiction," a discipline of "speculative design" that aims to explore the grey areas of the future away from the binary utopian/dystopian approach.[45] Defined as "The catalog of the near future's normal ordinary everyday" and produced by Near Future Laboratories, it lists only imaginary products, along with imaginary advertisements and even imaginary classifieds, developed by a team of designers, science fiction writers, science writers/students, and curators.[46] The framework of such a catalog of industrial products becomes a compendium of ideas in a form that contextualizes them in a retail environment as already available and orderable, which contributes significantly to perceiving them as real.

Eric Drass's *Cut Up* zine is an act he defines as "guerrilla epistemology," or "the deliberate manipulation of knowledge through the interjection

Figure 3.5
Cut Up zine by Eric Drass, a.k.a. shardcore, 2012.[47]

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of new ideas."[48] This was a printed zine intended to serve as a guide for The Great Escape, a music festival held in Brighton with three hundred mostly unknown bands participating. It was intended to fulfill a need for content, as the festival provided no further information about the bands, despite public interest and curiosity. *Cut Up* zine was distributed free of charge and contained computer-generated band profiles based on band data retrieved and remixed online. Drass ensured that the texts were used by bands of the same genre by referring to the song titles retrieved online in the reviews to make them seem authentic. The system he implemented was to generate a new review for each copy of his magazine and give them a random score out of ten. Thus, two copies could have completely different reviews and scores for the same band. This action only fulfilled readers' expectations, but *fulfilling expectations does not mean delivering trustworthy content*. Resolving the tension between the absence of information and the provision of information involves trusting the source or framework without further verification. Drass calls this work "algorithmic detournement,"[49] and it works in a similar way to the post-truth systems that pollute social media, where the information produced merely meets expectations, which is apparently enough to be acknowledged.

The importance of the framework of fakes is obvious in all these works of art. It affects their credibility, their impact on the audience, and is found in every format. This leads to the main question: How much do we need to know to trust the existence and operation of an entity that does not necessarily exist? And how much information do we need to trust a fact that has been invented, or doctored, or heavily manipulated? This subtle and abstract "critical mass" of information balances out in every fake, in the offline and online dimensions, but has a very different impact in the latter, in terms of scope and speed.

The Transition of Fake Publishing from Critical Art to Post-Truth Effective Manipulation

How did a practice intended to challenge the power of the mass media with clever hoaxes become a powerful tool of manipulation for the established powers?

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Once again, the key element of this transition is a different publishing ecology, social media, and the possibilities of persuasion and structurally aggressive noise that are enabled by *instant publishing* in an endless space. Its manipulative properties are based on enabling new publishing coordinates in space and time.

The traditional filtering and scrutinizing role of editors is replaced by algorithms that adapt the filtering of the countless posts that tend to, unconsciously or unknowingly, support hegemonic master plans by automatically promoting aggressive tactics, including the targeting of individuals through multiple secretly orchestrated profiles. Furthermore, unfiltered, direct communication between the author and the reader, where the highest popularity secures the loudest, most influential voice, reduces all subaltern followers to just approving by liking or commenting. This is technically an acknowledgment and empowerment of the most popular entities, even if followers openly disagree or even attack them. This structure seems to create a perfect populist environment. As Byung-Chul Han puts it with some emphasis, "When we click Like, we're bowing down to the order of domination."[50]

In social media, popularity is the territory where hierarchies and the powers of communication are negotiated. Mass participation is added and mediated remotely in the isolation of personal screens. The absence of filters and mediations traditionally undertaken by mass media editors constitutes a true realization of a global village. The illusion of horizontal accessibility and participation, where everyone can potentially communicate directly with everyone else, hides layers of social order that persist and deepen even more than in reality. For example, famous politicians can speak directly to their constituents and are never really questioned at the same level as they would be in a public debate. Similarly, anyone can comment and thus write on a celebrity's feed. In doing so, one feels very close to the star but never achieves a real closeness and paradoxically reinforces the figure's superstatus in social media by increasing the distance. The "open channels" of social communication, especially when they are privately owned, then, enable more cynical tactics of invisible information warfare.

In the 1971 book *Electronic Revolution*, William S. Burroughs, together with Brion Gysin, thought about a structure of collective media attack

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in the form of "operators with carefully prepared recordings out at rush hour"; they continued, "see how quick the words get around. People don't know where they heard it, but they heard it."[51] These multiple agents on the street were intended to create a memory of a message through their repetition in similar contexts. It was a message unconsciously heard and passed on, becoming part of perceived reality, though fully constructed, a mobilized coherent noise from multiple sources. The subversive stance of Burroughs and Gysin, which aimed to subvert the unattainable dominant media powers of the time, such as TV and newspapers, using only analog and personal recording devices, has been eliminated in contemporary versions of these practices. From the underground counterpropaganda to the official media and powers has emerged word-of-mouth propaganda, orchestrated by companies mostly working for political parties. The collective rumors are not spread by the public on the streets but by private companies on social media that manipulate the audience and weaken their capacity to discern. An exemplary strategy is to *reinforce the fears* of popular posts, such as the fear of job losses due to the influx of immigrants. Once the post is flagged, new posts are deliberately published that repeat the fear itself. There is a vigilant effort to maximize the instant publishing effect. Posts containing fake news and propaganda are then pushed, and when they receive thousands of likes, they reach the vanity KPIs (Key Performance Indicators) that lead to likes and shares by like-minded people, thus validating their beliefs to an increasing extent. After they have crossed a certain threshold, it is very difficult to contest these posts, and the fictional facts become (post-)truth. This system can be further secured by small armies of managed trolls with multiple accounts on social media, ready to step in to attack standard users or stop them from engaging in other political confrontation. These *social media machines*, hired by political and economic groups, take no prisoners, and they create false facts, usually backed by emotional content, which makes them very popular. And through emotional exposure, they can appeal to our cognitive biases with short, direct messages and create an instant publishing with a domino effect. They effectively exploit our "continuous partial attention," that is, the superficial attention we pay to multiple incoming sources of information, to amplify the message through its popularity through our quick judgment that generates likes and shares.[52]

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Post-truth "amounts to a form of ideological supremacy" and clothes information in a universal form, using brevity and emotion to grab our attention.[53] It circulates in an ecosystem perceived as word of mouth, an intimate exchange of information that enhances its emotional value. Social media is overflowing with this kind of utterance. The form is either the use of authoritative schemas or word-of-mouth oral culture: mere pictures, short texts, or, in their strongest form, memes. These semiotic objects with the fast temporality of the digital allow for the creation of an infinite number of fakes that give meaning to the definition of "post-truth."

There is a nodal element of transition from newspaper fake news activism to online fake news. The former is assembled around narratives designed to trigger responses through controversial, sometimes surreal, assemblages, while the latter are characterized by triggering a dimension of fear, being permanently prompted to respond and constantly involved in group conversations. In this underlying tension, the space of publication, which is instant and possibly without filters, that is, mostly *unedited*, shortens the amount of time for the necessary processing, so that the resulting simplistic form does not require time for reflection and decoding but only time to react. One of the results is the constant *solicitation to resend*, to share, with the resulting continuous polarizations moving between bubbles in a global arena in a literally ubiquitous space of publishing. Paradoxically, one of the side effects is that even the most radical satire sometimes goes viral because it is trusted as truth, as consequence of the radicalization of the news we are exposed to, which sometimes is not so far from the satirical narrative.

In this noisy media landscape, I would define what is made possible as the *1st of April paradox*. On this day, trust in any and all news, from whatever source (media, online platforms, word of mouth), is suspended, as we reasonably expect an inflation of false news published or spread as disguised news. The paradox is that April 1 is now the only day when our critical judgment is reactivated, when we doubt and filter every news item and check whether it is true or not, for it only to be deactivated again a day later when news that is distorted, exaggerated, or simply fake once again vies for attention and trust.

In an online publishing ecology where the ratio of signal to noise is increasingly shifting toward the latter, a very effective way of making

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propaganda is to create a more attractive noise that devours attention. The contemporary version of propaganda comes formally not from the ruling power (above) but from the public (below). The orchestrated armies of fake profiles, ready to attack and seduce, verbally and visually, as a special unit, are the most effective way to direct opinions, under the collective illusion that they are produced spontaneously. These strategies build *virtual factories of spontaneity*. They produce and amplify the so-called "alternative facts" as needed, play with emotional content, and create consensus. When the lies are widely accepted, they become the starting point for new lies, new fake news, and new alternative facts. So, the language used is highly redundant and eventually the starting point is lost.

It is such a vast and easily triggered phenomenon that there are very few ways to defend against it; but one of them is to maintain awareness and trust in the sources. Somehow it is about properly shaping our own networks of trusted nodes, becoming editors and thus filters of our informational flows, forming alliances with other trusted editors, and consuming information responsibly, in an open, not endless or purely self-rewarding, publishing ecology.

Authorship, Remixes, and Deepfakes

If we analyze automatic writing as a process of remixing, we can see how authorship and style play a crucial role in the evolution of machine-driven textual transformations. The increasing sophistication of algorithms, and the proliferation of available sources, has had an impact on the acknowledgment of the texts they produce, including a technical analysis of style that lays the groundwork for their profound simulation and raises open questions about how they edit preexisting material.

Since the 1990s, for example, there has been a plethora of experimental software that more or less functions as discourse generators. Most of them were based on recursive grammars, and even if they were quite repetitive, they usually had a solid structure and guaranteed interesting, often hilarious results, with a decent corpus. From what could be a long list, two examples should be mentioned here.

The first is The Instant Art Critique Phrase Generator, purportedly by either artist Petra Häschen or Robyn Belair. It generates exquisite phrases

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that can be applied to almost any conventional artwork through a controllable scheme, such as: "With regard to the issue of content, the subaqueous qualities of the figurative-narrative line-space matrix notates the essentially transitional quality."[54] The second is the well-known Postmodernism Generator, developed in 1996 by Andrew C. Bulhak of Monash University, which creates imitations of postmodernist writings in the form of entire articles. One example is:

> 1. Predialectic narrative and textual discourse
>
> "Class is fundamentally dead," says Marx; however, according to Hubbard[1], it is not so much class that is fundamentally dead, but rather the collapse, and subsequent defining characteristic, of class. Thus, Lyotard uses the term "expressionism" to denote a self-referential totality. Baudrillard promotes the use of structuralist narrative to deconstruct and read society.[55]

These online applications highlight the limitations of certain formats in certain contexts, in these cases the review and the essay, and the resulting expectations of the reader. Here the machine provides the iterations through the corpora used, but the structure of the processes used to generate the sentences is transparent or easily inferred, and it is ultimately almost combinatorial work. We press a key or simply rerun the process and the software turns out to be an almost mechanical process. But this process can be called a remix because it technically meets its definition: the elaboration of samples "from preexisting materials and combining them into new forms according to personal taste,"[56] and it can be used to create credible fakes.

These examples show a certain style, as the trust in literature essentially implies a projection of what is written onto a person, the author, and onto his perceptible style. To discuss this particular aspect, it is worth looking at one particular work from 2012, *The Death of the Authors, 1941 Edition* by Femke Snelting and An Mertens,[57] part of the Belgian collective Constant, which undeniably refers to Roland Barthes's "The Death of the Author," at the level that it seems to embody its main argument: "To give a text an author is to impose a limit on that text," but technically to the extreme.[58] It is generative software that produces a freely downloadable novel based on various texts by Virginia Woolf, James Joyce, Rabindranath Tagore, Elizabeth von Arnim, Sherwood Anderson, and

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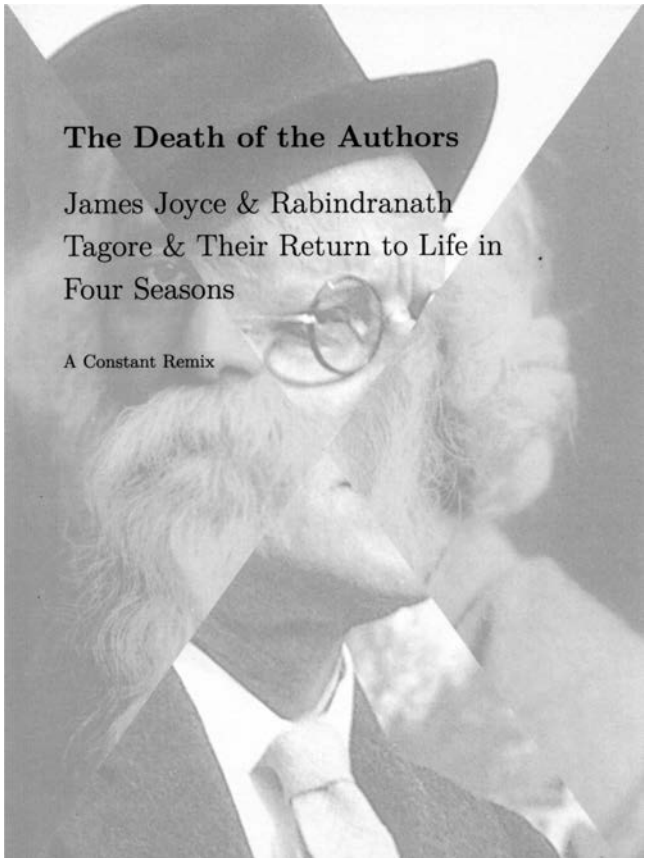

FIGURE 3.6
The Death of the Authors, 1941 Edition by Constant, Association for Art and Media, 2013.

Henri Bergson. Snelting and Mertens become the ultimate "scriptors" in Barthes's definition,[59] creating the programming code for the final result. The work was published on January 1, 2012, to celebrate the authors' works becoming public domain, as they all died in 1941, and their works were protected by copyright for up to seventy years after their deaths.

Its literary gesture is the result of a remix practice, but in its final publication it is entirely determined by the software. The author's content then becomes magmatic and ethereal, reborn and archived with each new generation. The respective authors are somehow back with all their

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style in an unpublished, unexpected, and ever-changing collaboration. Can we consider this remix a fake? Its practice is explicitly codified in a kind of credible apocrypha, where style and the availability of preexisting material are essential. As is usual with the combination of literature and software, copyright law sets limits, as the software could work with more recent novels or contemporary authors as well. Indeed, Snelting and Mertens raise a specific question: How sophisticated does the literary remix have to be to blend seamlessly and at the same time be attributed to the simulated authors without formally violating copyright law? In an interview, they explicitly refer to the "ultimate 'n-gram'"[60] to test this process: "What if we would try to put together a new novel using only a sequence of maximum three or four co-occurring words, out of existing works."[61] If successful, the practice would come close to the technical disappearance of the samples and the corpus, which is instead very present in its acknowledgment of the final result. We can compare this kind of n-gram and its extremely short length, which gradually disappears in the work, with the micromusical samples used in granular synthesis, which work on the time scale of microsound and usually disappear in the work as well.

But all this practice inevitably leads to the definition of an author's style, which in turn points to a larger scenario that relates to the identification and possible measurement of style. Stylometry is the discipline concerned with the comparison, measurement, and possible validation of the attribution of a particular work of art to a particular author.[62] Its techniques, based on statistical analysis, machine learning, and access to large datasets of the author in question, have been successfully applied to literary texts and music. The scientific attribution of a text to an author is a challenging concept, as it simultaneously reinforces and weakens the perceived presence or mark of the author. The sophisticated methodology also used in forensics collides with the reader's imagination, which is still bound to the perception of an uncatchable style that is recognizable but still eludes any quantification, which is rather what the procedures of stylometry are about.

The perceived presence of the author has been analyzed in depth by Michel Foucault. The "status [we give to an author] when we began our research into authenticity and attribution" is that of a presence that is strictly tied to the author's name.[63] This serves as a "means of classification."[64] The

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author's name is also essential in the remix process, as it is the main, irreplaceable reference for the texts to which it belongs, or, in other words, it serves to "group together a number of texts and thus differentiate them from others."[65] So the author's name "remains at the contours of texts—separating one from the other, defining their form and characterising their mode of existence."[66] Finally, the function of an author is to "characterise the existence, circulation and operation of certain discourses within a society."[67]

The remix of different authors thus directly affects their work. Should Balestrini's "TAPE MARK 1," even if it is explicitly derivative, be included in the bibliographies of Hachiya, Goldwin, and Lao Tse? And what about Snelting and Mertens's endless and equally derivative mash-ups of Woolf, Joyce, Tagore, von Arnim, Anderson, and Bergson? According to the criteria in force, they should not, but from a creative perspective that would seamlessly include "new" works, this very concept of an author's bibliography might start to be challenged.

In this context of automatic authorship, it is useful to define the term "deepfake," which was introduced to categorize synthetic content, mainly video, and by extension also audio, in which a person is replaced by the image of another person. The sophisticated technique used here shatters trust because these videos and audio files look and sound real and can mislead even an attentive audience. A corresponding text product, an autoregressive language model, can generate text based on short prompts, using ever-larger corpora on the order of gigabytes. At this level and in the context of authorship, the potential to confuse, mislead, and manipulate the reader by impersonating someone else is quite high. Apart from the confusion at the pure communication level, there is a second relevant problem: this technology potentially puts the historical validation of works in a very difficult position. If we consider deepfakes as remixes of the corpora, which should be legitimate based on what we know about the technologies behind them, the "aura of the original" simply disappears as it gets lost in the quantity of references and in the quality of elaboration: the final result may be indistinguishable from the preexisting works and cannot be traced back to all its different sources, so that in the end it technically acquires the same status as them.[68]

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To quote Foucault again, "the Author is a certain functional principle by which in our culture, one limits, excludes and chooses, [and then] is therefore the ideological figure by which one marks the manner in which we fear the proliferation of meaning."[69] The potentially uncontrollable spread of meaning triggered by deepfakes takes forms that call into question the very notion of authorship as well as the whole process. What deepfakes bring about is the actual disappearance of the concept of a preexisting work and the trust we place in it by redefining the nature of the material used before and during the remix process. In deepfakes, the former existence of the material is obscured, both technically by the seamless simulation of elements such as the writing style, or the face in videos or the voice in audio files, and conceptually by the credibility for a large audience that would have no compelling reason to question the authenticity.

The acknowledgment of samples, or the acknowledgment of preexisting original material that is validated as original, is questioned by deepfakes who systematically avoid any explicit and verifiable source or reference to what was used in their process. To speak of an original then simply seems challenging, while its concept is deeply shaken: only a historian of the subject/author or a sophisticated algorithm could distinguish a credible fake from an authentic production. The acceptance and accumulation of deepfakes in our visual and written culture would increasingly mean the layering of fake but acknowledged preexisting material that we cannot verify over time. After all, a deepfake's only reference to other works is style, which, while not codified, is nonetheless algorithmically generated.

These potentially infinite new digital productions of originals would seriously challenge the historical attribution of their samples. Paradoxically, the only remaining valid preexisting materials would increasingly belong to the past or the predigital era, with their still authenticated records of existence and production. Then the machine-driven texts of the postdigital age could become remixes without references. Their content would be produced through the sophisticated elaboration of earlier forms and styles in a way that looks and feels like a new original. As these new originals become the norm, they will potentially reformulate the categories of work, pattern, and authorship that we still use today.

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Networks of Trusted Humans

In this historically uncertain scenario, where the speed and the emotional charge of fake information can have devastating effects, collective memory is challenged because it is how we operate our representation of reality. With the instant publishing quality on social media, users experience the thrill of expressing an opinion on every possible topic, often mixed with self-attribution of expertise in every possible field, referencing other opinions or "facts" that can also be found exclusively online. An example of this is Eric Drass's *@factbot1*, an emblematic tweetbot that generates false scientific facts and links them to an image.[70] It is a classic synthesis, easily cited as true and potentially exposable as fake after some doubt would prompt even the slightest scrutiny. The greatest risk of post-truth, however, is the rewriting of history, at least in the memory of large numbers of people. These kinds of nightmarish dangers inherent in the digital were perfectly described by George Orwell in his paradigmatic *1984*, where the power went so far as to physically alter media at will, destroy original copies, and ensure that "in no case could it have been possible [. . .] to prove that any falsification had taken place."[71]

What options do we have to prevent the risk of online history being written by machine? Should we imagine an underground resistance, like in Ray Bradbury's novel *Fahrenheit 451*, that memorizes historical sources?

These are open questions, of course, but it is very important to understand the importance of building an information dam, a barrier, to protect our minds from being flooded with data, especially emotionally charged data. There are these elements that can be considered to enable a publishing ecology that is more resistant to mass manipulation by fake news and post-truth strategies: the sources, the pace of information gathering, and the personal trusted human network.

Sources and the Collapse of Context

Sources are crucial because in most cases they indicate whether information can be trusted or not. Sources must be authoritative, but they can be at any level, from a single person to a global organization; they must be backed by knowledge, expertise, and scholarship. They can effectively

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counter the word-of-mouth effect of online dissemination and rapid collective confirmation or rejection in the collapse of contexts. In 1969, McLuhan warned that "the new media [. . .] reshape what remains of the old world at will."[72] So sources can provide the lost context, just as reading texts can contextualize their titles, which are too often reported in isolation because they create new and faster publishing ecologies without context. In general, we should instead reclaim context as a necessary condition for understanding. Moreover, the space and time of a source is usually identifiable and verifiable, unlike the numerous, and sometimes transient, voices operating and amplifying each other on social media, driven by a group dynamic or, at worst, a cynically orchestrated strategy.

The Pace and the Personal Information Dam

The speed with which information reaches us depends greatly on the number of sources we have competing for our attention. In his 1968 novel, *His Master's Voice*, Stanisław Lem describes freedom of expression as a potential "threat to an idea, for [. . .] what can be done when an important fact is lost in a flood of impostors?"[73]

We can experience "floods of impostors" on social media because mass participation on these platforms has concretely enabled a multitude of online identities to share content and opinions. They come through our screens, and these screens are accessible anywhere, anytime, so there is always a chance to engage. The ubiquity of screens has often been described as "nomadic," but *screens are elusive, not nomadic*: they define the space and time of our access to content that is temporary, floating, algorithmically recurring, or pushed away, whose rules are programmed and imposed by the respective platforms. One of the few solutions to countering the "flood," then, is "stopping the spread."[74] This means building a personal information dam by regularly checking dubious sources and cross-checking facts with authoritative people, official sources, and recognized experts who still want to stand out from the unstoppable stream of instant opinions. Building a personal information dam can be seen as part of the process of stopping delegating trust and crucial tasks to the machine just because it is faster and more visually appealing.

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The Personal Network of Trust

The group of trusted human references can then support the context given by the sources and slow down the pace of spread. The extreme dynamics of the viral spread of post-truth can be equated with Hannah Arendt's arguments about the use of lies in totalitarianisms: "If everybody always lies to you, the consequence is not that you believe the lies, but rather that nobody believes anything any longer."[75] Lies produced and spread for propaganda purposes spread at high speed thanks to spontaneous collective support. The thrill of being part of a big phenomenon triggers the spread of the content. So reducing the global to the personal network would mean setting another critical limit to the amount of information consumed and shared. Building *trusted networks of people and sources* will lead to feeling equally part of an inclusive process of shared and trusted content and contexts.

I, myself, experimented with the production of fake newspapers as a student and over the years conducted several workshops on imagining a fake future newspaper in different contexts, in some cases even printed and distributed in urban spaces, including at unaware newsstands. What I have noticed over the years is that there is a common attitude of speculating about the present with an ironic, if not sarcastic, future, and using it as a cathartic tool to cope with the complexity of the here and now. But faking through a trusted network enables an atypical contemporary "discourse network [. . .] the network of technologies and institutions that allow a given culture to select, store, and process relevant data."[76] A contemporary discourse network would necessarily depend less on the technological infrastructure and more on the people who are part of the knowledge infrastructure (e.g., experts, scientists, journalists, teachers, scholars, librarians, knowledgeable people).

A network of trusted people, which replaces the rapidly increasing value of popularity with expertise, also becomes custodian of reliable sources, which are among the best antidotes to post-truth, which benefits enormously from the collapse of context. These kinds of networks can be a comprehensive shield against the emotionally overwhelming onslaught of the infinite stream. Members earn trust and can refer to sources. This creates a trustworthy, scalable, and sustainable knowledge network that

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is less susceptible to accepting and being influenced by the orchestrated mass campaigns of post-truth lies.

Human Mesh Networks

It is important, then, to consider the construction of networks of connections that create meaning, since as Miguel Carvalhais says, "we derive meaning relationally."[77] Given the increasing commercial attention on the number of connections that build self-confidence, building instead scaled-down networks, characterized by the importance of the exchange rather than the quantity of signals exchanged, can dismantle the popularity paradigm. If what matters is the list of "associations," then "the more connected, the more individualised a point was."[78] It is a privilege to access infrastructures whose participating entities can coalesce around particular ideas and projects and form new, independent networks and subnetworks, reducing complexity by being aware of network topography. The six degrees of separation of potentially significant nodes should help us find the human capital we want to collaborate with, to escape the sick dream of being either a hyperactive celebrity or a hyperactive audience. We should value our discoverability in the contexts we value most, to give proximity to and receive from the nodes we want to network with, most of whom operate outside the industrialized platforms. We should build *human mesh networks* whose interdependence preserves the possible multiple layers of application and the collective dimension. Network topology in political, cultural forms embodies the concept of network as a supporting infrastructure, a dynamic backbone of decisive actions. And networks are collective agents that contribute, author, enable, and propagate content. They are an essential part of the strategies needed to initiate an alternative vision of society and to rethink digital boundaries and conceptual possibilities. Once we master the charm of infrastructure and human scale overrides technological complexity, we can begin to design our own networks of trusted nodes and form alliances of trusted information entities in an open, non-self-reward-driven attitude.

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4

Endlessness: The Digital Publishing Paradigm

Online publishing often adopts the format of endlessness, where the screen provides a seemingly ceaseless space where content can be scrolled indefinitely, new material uploaded to fill the visual void or silence, and the reader can decide when and where to stop.

This new paradigm is the latest technical and conceptual step in an evolution that has been envisioned since the first attempts to overcome the finite space of a printed publication, when attempts were made to invent a *boundless publication* that would have transcended its inherent physical and spatial boundaries. The endless paradigm became possible through the early efforts to aggregate information into smaller analog spaces, followed by its digital dematerialization. And it was possible also due to the explosive enlargement and rapid advancement of media technologies, which led to a wealth of technical resources that dramatically increased both computational and networking power. This model is viable due to the ongoing severe fragmentation of digital information created by popular online short publishing formats. One of the immediate consequences of such fragmented, elusive dissemination is the increased archival role of printed publications, which have been granted a new charm due to their undersupply and physical design characteristics in contrast to the ubiquity of digital media. With the seamless blending of information—of the personal, even intimate, with the public and global, for example, through the overlay and interplay of social media and global news media—this endless dimension can be interpreted as a new form of broadcasting.

Starting with an archaeology of digital publishing concepts and their tension with an endless structure, this chapter discusses how current publishing structures are based on bespoke, potentially endless loops of

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self-gratification. The result is a need to counterbalance this industry-based scheme through potential networks of critical human editors at different levels to reduce the unmanageable amount of knowledge we are exposed to, and its resulting complexity, and instead enable focused, shared, and collaborative knowledge exchange.

This chapter aims to offer possible solutions to the current disconnection between the industry and critical thinking editors, and to consider how the complexity of the insurmountable amount of information we are exposed to could be reduced through shared and collaborative knowledge sharing.

Looking for the Spaceless Book: An E-Publishing Archaeology

The concept of assembling a publication is to fit a certain amount of content into a manageable space. But once we got used to the dimension of the *single* publication, we tried to overcome its limitations and expand it to include as much information as possible in a new recognizable form. Multivolume works and then encyclopedias have helped to subdivide what could not be confined to a single manageable space. But after the dematerialization of this physical space, the boundaries of publication became blurred in their technical representation, first mechanical and then electronic, which had to *represent* the pages and the publication as a whole. And then these boundaries simply disappeared in the multitude of content that could be temporarily accommodated on a screen, making room for prototypes, and visions.

The History of the Infinite Publication

The desire to increase the space for content in publications is part of the more general desire to overcome the limitations of a fixed space. However, the need to overcome size constraints in publications can also be framed as a *technological* issue, as the printed format easily reaches its limits when it either becomes unreadable, if an attempt is made to reduce the size of the content excessively, or becomes unwieldy, if a certain threshold is exceeded in terms of binding or physical number of pages. Historically,

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the first approach to increasing standard spaces of content was to progressively reduce the size of the content in each space by mechanical means. In the past, the size of the readable space had to be fixed in advance, that is, either a page or a certain degree of opening of a scroll, and the content simply filled this space according to fixed ratio rules.

The idea of collapsing the space of content became popular in the twentieth century, because of an increasingly global information society and the development of mechanical and electrical technologies. And the first wave of attempts to collapse the space of content was based on optical technologies.

Breaking the boundaries of printed publications was something El Lissitzky had in mind in 1923 at the end of his manifesto "The Topography of Typography": "The printed surface transcends space and time. The printed surface, the infinity of books, must be overcome. THE ELECTRO-LIBRARY."[1] To this sentence is attributed the vision of the Internet, or rather of today's digital space of publications. But we can see in it two specific visionary elements. The first is "the infinity of books," which probably alluded to an ideal at the time of overcoming the slowness and heaviness of printing, hampered by power and technological limitations. Overcoming space can thus be interpreted as overcoming the physical limitations of content space; and transcending time can be interpreted as asynchronous access to content that would have allowed simultaneous access to multiple content sources. Lissitzky's manifesto also describe "the continuous sequence of pages: the bioscopic book,"[2] which can be interpreted as a further consideration of a wide, even indeterminate, continuum of content flow, with the consequence that the size of the content, or publication, cannot be fixed a priori. The size of this *continuous publication* would remain unknown until we reached its end, not unlike the perception of digital publications whose size is unknown until we reach the end of the file, if at all. A few years later, in the second half of the 1930s, the *fax newspaper*, or *radio newspaper*, was developed.[3] It was intended to allow a radio listener to print a daily newspaper at home at a specific time of day, freeing the publisher from the heavy and costly distribution infrastructure. The newspaper was transmitted via special radio frequencies and then decoded and printed out via a special device integrated into the classic radio receiver of the time, in the form of a scroll.

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The reader also did not know in advance how large the scroll was until it was fully printed. The concept of not being able to determine the amount of content appears again and again in various ideas about the future of publications and refers to a model that abolishes visible and perceptible size by implementing a temporarily unmeasurable flow of information. The "continuous sequence of pages" had a conceptual implementation in Vannevar Bush's conceptual system Memex, in which a microfilm-like medium would have housed an indefinite amount of content with search functions.[4]

This need for a collapse of content space can also be found in some of the prototypes of the do-it-yourself scene, which today would be called the maker scene, that proliferated in the first half of the twentieth century, using all kinds of electrical and electronic tools to build innovative machines that were documented by inventors and tinkerers in magazines like *Popular Mechanics* or *Radio and Television News*. An example of a prototype that challenged the size of a publication was tested by an inventor who took an innovative approach. Instead of inventing another medium to accommodate a larger amount of content, he wanted to minimize the space of print; not so different from what would have been done a few decades later by microfilm. The prototype was realized by Bradley Fiske, a retired admiral, who in 1922 developed a "reading machine," a small device that could read novels printed in very small type on small paper cards that were optically magnified with a lens, thus collapsing the usual space of print while enhancing its portability.[5] A few cards could hold more than one hundred thousand words, so there was enough space for an entire novel. And although this invention never became a commercial product, it was certainly a precursor to microfilm. During the same period, the 1930s, Bob Brown, in his book *The Readies*, described a comparable universal reading machine "using strips of miniaturized text."[6]

As commercial publishing flourished and the ability to read increased from generation to generation, the space occupied by content was recognized as a problem early on. A practical DIY solution to the problems of content was picked up by a Spanish teacher who wanted to free her students from the burden of their textbooks. In 1949, Ángela Ruiz Robles built the prototype of a mechanical book that would contain more content than a classic textbook. The "Enciclopedia Mecánica" (Mechanical

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Figure 4.1
Fiske reading machine, between 1921 and 1923. Photo: Harris and Ewing/Library of Congress.

Encyclopedia) used similar optical principles to the machines mentioned above: it was housed in a plastic case with texts and illustrations on rollers that were easily removable and interchangeable, and with parts to facilitate writing and drawing.[7] The scrolls, which addressed different subjects, were under a magnifying sheet with a light for reading in the dark and, in a second prototype released in 1961, a spoken description of the subject.

All these conceptual machines and prototypes were remarkably based on the same principle that was later applied to microfilm technology:

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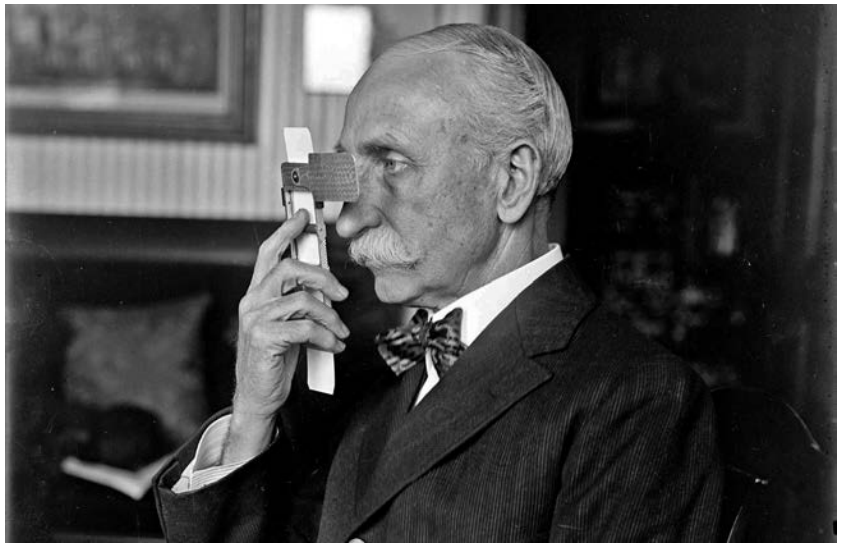

FIGURE 4.2
Fiske reading machine (particular), between 1921 and 1923. Photo: Harris and Ewing/ Library of Congress.

the physical collapse of content space. These prototypes used optical or mechanical technologies to perform a dual function: to reduce the space normally occupied by the content and to retrieve it when needed.

Size and space were, and remain, a fundamental common feature of these concepts to produce *transportable devices* that are, overall, smaller or lighter than classic printed publications. It is evident that technology in the first half of the twentieth century sought to address the twin triumphs of the increasing literacy of society and the increasing access to, and desire for, printed publications—fueled by a burgeoning publishing industry—by seeking solutions to the problem of the weight of texts without losing their content or quantity. These possible solutions aimed to create a space where volume was not equated with heaviness, thus separating access from physicality, which could only be imagined before.

What these devices were designed to change was not only the space but also the time of access to content. Firstly, thanks to the greater flow of information, they inherently enabled the training of faster reading. I would define these devices *containers* that allow content to be dynamically updated and replaced, breaking down the relationship between the

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medium and the content, as firmly established in printed media by the universal forms of printed publications, especially the book, the magazine, the newspaper, and the encyclopedia, that had remained unchanged for centuries. And they all share the format of *scrolling information*, or *flowing on demand*, with content structured as scrolls and flowing to be accessible through the mechanics of the device. All these elements seem to pave the way for what digital media would enable on a very different scale a few decades later: *endless publishing*.

The Science Fiction Vision

In parallel to visions and prototypes conceived in the golden era of technical do-it-yourself, the 1920s to 1960s, science fiction has established recognizable fantasies of publishing futures. After being a literary territory intended to forecast a narration of the future at large, it has consequently assumed an archaeological importance within the history of the media, as articulated in and through all the imagined and predicted inventions, prototypes, and ideas written in novels and realized, or forgotten, years later. So a vivid and advanced imaginary about the infinite book can be retrieved through the literature of various science fiction writers, who have provided different visions of a truly expanded ad infinitum publication.

A few comparable ideas in these novels involve "systems" and "machines" as scientific or technical agents pushing the limits of media as we know them. One of the first and most famous examples that align publishing to the infinite dimension is Jorge Luis Borges's 1941 story, "The Library of Babel."[8] Although technically not yet defined as science fiction, Borges describes an infinite library that contains all of the possible books that could be written and the possible cultural and psychological consequences affecting those approaching it. More examples were described later. In 1948, Richard Shaver, in *I Remember Lemuria*, wrote about an enigmatic object that he called a "pocket reading machine," which was so common that it would have not attracted attention.[9] Even though it was just outlined in a few words, this elusive device was considered portable, small, and functioning as a machine, including some systems for reading. In 1951, Isaac Asimov in his short story "The Fun They Had" featured two of the protagonists describing "telebooks" over a dialogue. A couple

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of kids living in 2157 find an old printed book from the previous century and, comment: "What a waste. When you're through with the book, you just throw it away, I guess. Our television screen must have had a million books on it and it's good for plenty more. I wouldn't throw it away."[10]

Apart from the naïve ecological considerations that do not consider the waste of natural resources for the production of the television and the electricity needed to run it, here the two media, television and print, formally merge to dematerialize the printed content in the air and feed it to a machine that has already been tested. This machine, the television set, is capable of temporarily putting content on the screen and replacing it at will, so that it can potentially hold an infinite amount of content. As early as 1934, the *television newspaper,* mentioned above, appeared in illustrated form in the syndicated comics "Can it be DONE?"[11] in which a couple is sharing the news in front of a large-screen television the size of a tabloid newspaper.

All these visions technically focus on containers for content that are considered media in their own right. They are machines or devices that are intended to serve as a universal interface for accessing content, consisting of distilled units that can be expanded and accessed within the device. They all envisioned an evolution of existing media into an updated and more powerful version where there are no clear spatial boundaries for content.

An attempt to realize this ideal outside the constraints of the existing media form is articulated in Stanisław Lem's *Return from the Stars,* written in 1961. Here he outlines a completely new system of publishing through the description of a bookshop:

> The books were crystals with recorded contents. They could be read with the aid of an opton, which was similar to a book but had only one page between the covers. At a touch, successive pages of the text appeared on it.[12]

The "opton" is the counterpart of the actualized devices envisaged earlier, which are containers of content. It reads the book crystals, a type of e-book that is the final product sold to the public. However, the bookshop can produce the crystals independently, like a publisher syndicating books: "As a rule, a bookstore had only single 'copies' of

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Can it be DONE ?
Our Popular Inventions Series
HM — TWENTY DEAD AND FIFTEEN MISSING!
Morning Newspaper
DIRIGIBLE IS DOWNED AT SEA
TELEVISION NEWSPAPER
SOME DAY YOU MAY BE ABLE TO RECEIVE THE FRONT PAGE OF YOUR MORNING NEWSPAPER THIS WAY — FULLY PRINTED AND SHOWN ON THE SCREEN OF A TELEVISION SET.
CAN IT BE DONE?
It may not be very long before the news is broadcast by vision instead of the spoken or written word. Rather than: "Can it be done?" we might well ask: "When will it be done?"

FIGURE 4.3
"Can it be DONE?" syndicated comic, *Scoops* magazine UK, June 23, 1934.

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books, and when someone needed a particular book, the contents of the work was recorded in a crystal. The originals—Crystomatrices—were not to be seen; they were kept behind pale blue enamel the steel plates."[13] The bookshop has well-protected "originals" that guarantee the integrity of the contents and can "record" as many copies as necessary. Strangely, in this environment of dematerialized content, printing still exists, but only for "scientific publications" published on "plastic imitation paper."[14]

A very realistic description of an "electronic book" is told in *The Hitchhiker's Guide to the Galaxy* by Douglas Adams:

> A screen, about three inches by four, lit up and characters began to flicker across the surface.
>
> "You want to know about Vogons, so I enter that name so." His fingers tapped some more keys. "And there we are."
>
> The words Vogon Constructor Fleets flared in green across the screen.
>
> Ford pressed a large red button at the bottom of the screen and words began to undulate across it. At the same time, the book began to speak the entry as well in a still quiet measured voice. This is what the book said.[15]

Apart from the green color of the characters, which was typical of most computer monitors of the time, the description is reminiscent of Alan Kay's Dynabook prototype from 1972, which we will discuss in the next chapter. The vision of a "container" became a realistic device, and content began to materialize on the screen.

In 1989, a few years before the commercialization of the Internet would have completely revolutionized the media landscape, science fiction writer Ben Bova wrote the story of a young programmer who invents an electronic book device, and how it shakes up the New York–based publishing industry, in his novel *Cyberbooks*:

> From it he pulled a grey oblong box about five inches by nine and less than an inch thick. Its front was almost entirely a dark display screen. There was a row of fingertip-sized touchpads beneath the screen.
>
> The content is "read" by this device in the form of "chip wafers" but what the protagonist was passionately questioning was the potentially uncontainable nature of information: "I contend that publishers are in the information business, not the wood pulp and chemical industry.

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> What you want into the hands of your readers is information—which does not necessarily have to be in the form of ink marks on paper."[16]

This focus on information as an abstract entity and the central electronic device as a "product" can be interpreted as predicting the mission statements of many online media companies since the early 2000s.

The concept of a container in which information floats persists in the new millennium, as shown in the 2002 film *Minority Report*, in which the newspaper that John Anderton (Tom Cruise) holds in his hand while a fugitive in a public transport vehicle consists of a few pages digitally updated in their own space and animated by current news reports.[17]

All these different technologies presented share a common desire to transcend the limitations of the page and the sequential order of binding that have defined the physical space of content in print for centuries. Their main goal is to have all the content, and to some extent all the knowledge, they need in a single place that is both open to being expanded ad infinitum and inclusively retains the material they need. These premises have slowly been realized through software and networks. In the 2010s, thanks to the speed and ubiquity of networks, the original McLuhan concept of physical publications extending our memory was both imploded into the visual space of small device screens and exploded into their unfathomable access to endless content.[18]

The Digital Endless Collapse of Content Space

Digital machines have inherently collapsed the space of information. Their development is based on a long historical evolution of electronic miniaturization of both processing and storage elements. Over time this has led to an exponential multiplication of the contained digital information space, in smaller devices with larger storage capacity or networked access to almost infinite content spaces.

If we try to identify the first electronic device explicitly focused on cultural content, the *Dynabook* prototype, conceived by Alan Kay in 1968 and unfortunately never realized, is a good starting point. It was the first complete model for an electronic textbook, in a form we would now easily call a tablet or e-reader.

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In his 1972 paper, Kay describes the technical specifications of the *Dynabook*:

> The size should be no larger than a notebook, weight less than 4 lbs.; the visual display should be able to present at least 4000 printing quality characters with contrast ratios approaching that of a book, dynamic graphics of reasonable quality should be possible; there should be removable local file storage of at least one million characters (about 500 ordinary book pages) traded off against several audio (voice/music) files.[19]

The print quality of the display was treated as an important element, as it would ensure the use of the screen as a functional substitute for the printed page. And equally important was the "removable," that is, expandable, file storage with a standard minimum size of the contents of a large book, potentially expanding to the size of an entire collapsed library. Furthermore, it theoretically involves the recurring theme of scrolling, as the transition from one page to another was not achieved by turning the page. Conceptually, this involves a shift from the conscious decision to mark something as read with a gesture, turning the page, to simply replacing the page in the same area of the screen, in a sense "unrolling" the subsequent content immediately in a longer continuous stream or scroll. Finally, the exchangeable memory repeats and demarcates the conceptual shift from the finished media product, the publication, to the single container with replaceable content, the device.

This transition, representing a reversal of perspective, should have been initiated by a specific event: the optical qualities of publications reaching their limits of resolution and space, both on paper and on celluloid. The next step was the technical investment in a container with a comparable resolution, but without spatial limits for the content, perceived through a single screen. In general, the screen itself has very tangible boundaries, but its content has none. The most important conceptual consequence is that the screen becomes a single universal space that potentially contains all the possible conceivable content and reconfigures its matrix of basic elements. And the more we experience it, with a potentially extreme diversity of quality and quantity of content, the more we tend to think of it as infinite and universal.

Historically these devices were connected first physically and then wirelessly via networks to an invisible storage space. We probably assumed that

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there was an infinite storage repository somewhere, possibly containing all the content we needed, and that this content would then be retrieved from there and dynamically rendered onto the screen's pixel matrix at will.

Where exactly it is stored, who stores it, who owns it, who can change it, edit it, or delete it is largely irrelevant to the average user, especially compared to the captivating spectacle of content that is instantly available and endlessly scrollable. The combination of an infinitely reconfigurable screen with remote and limitless storage explodes all possible size constraints in our imaginary. This creates space for high expectations of content that are constantly renegotiated but always satisfied, as the failure to find what we actually want is endlessly and excessively replaced by similar content that is continuously and quickly replaced and thus negated or forgotten.

For example, when we do a search on any of the major platforms (search engines, social media, databases, etc.), if we do not find exactly what we want, we are seduced by an overabundance of alternative content, so that quantity takes the place of quality. This mechanism makes many people susceptible to what they are offered, because the supply of content is in fact infinite. This is a process of subtle substitution, where what we want is constantly replaced by what the algorithm dictates. El Lissitzky stated in his 1926 work *Our Book* that "The amount of material used is decreasing, we are dematerialising, cumbersome masses of material are being supplanted by released energies."[20] These energies have apparently become ubiquitous and are constantly being replaced. If we consider them historically as "archeologies of the present," we must consider data storage, transmission, and computation and include them in the equation that describes what we really need or want to know and read, and what we consume instead in this space.[21]

An infinite content means availability, which does not prevent us from expanding it through the content we produce on different platforms. We can consider the act and gesture of posting on different Internet media as an act of *instant publishing* that increases the total amount of content and allows us to contribute to it. On the one hand, the interconnected online content cannot be considered as a single infinite publication because of its diversity of topics, formats, and quality, forming a *multitude*. On the other

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hand, the quality we ascribe to traditional publications, characterized by sophisticated content, finitude, and consistency, cannot be applied. Conversely, the online digital system is governed by two important time/space coordinates and qualities: *instantaneousness* and *abundance*.

The Endless Publishing Paradigm: Space, Time, and Memory

Since the early prototypes of spaceless publications, the digital industry has radically reshaped the media industry, maintaining a conceptual focus on the *container* rather than the content. But this container, materialized in a screen-based digital device, has rapidly evolved from a tool for accessing an infinitely higher amount of knowledge, to the absolutely central mediator of the majority of the knowledge we experience and also of an endless amount of knowledge that is constantly available. This can be understood statistically. Over the years, the amount of online content available has grown exponentially: it is estimated that there are in the region of tens of billions of web pages.[22] Looking at social media, which is increasingly part of our daily media consumption, the amount of content published is even more impressive. The total number of Facebook posts[23] and tweets on Twitter[24] runs into the trillions, and Instagram posts[25] number in the tens of billions. Moreover, most access to Internet content is done over the airwaves via Wi-Fi and mobile networks, with the containers we carry being the only remaining physical part.

In today's scale of information production and consumption, we should bear in mind that publishing involves three main coordinates: *space*, *time*, and *memory*. To define a publication, it is essential to determine the space of its content, so we need to perceive its boundaries to understand it as such. In digital environments, this perception must refer to the limits of the display and thus the screen, which is the only physical space for the content that we can see. Here, we can only infer the size of a piece of content by scrolling through it or by paying attention to user interface indicators, typically the dynamic size of scroll bars, or the number of pages displayed. These are visual quantifications, but they are essentially expressed in abstract terms that cannot be imagined.

Time also plays an important role in deciding how long we will read. This is influenced and often determined by the size of the publication,

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as well as the reader's willingness to engage with it fully, partially, or not at all. In online digital publishing platforms, there are a variety of plug-ins that are programmed to give an estimated reading time next to the articles. These plug-ins have proved popular with professional blogs. Software has been developed to automatically estimate the reading time for each text. This software can be implemented in online and offline digital publishing platforms such as Amazon Kindle. On these platforms, time is equated with experience, often quantifying abstract constructs of the "quality" of reading that go beyond the "quality" of what is actually read, as this cannot be easily quantified.

External memory, conceived as a prosthetic extension of our biological memory, is more about the ability to shop content and recall it in an acknowledged original form. Then we are also able to personally reconnect and relate to it by creating a space where we, the content, and its form belong together and where our biological memory reinforces the experience. But when the form of the content is experienced on the same screen as thousands of other pieces of content, the newly created space inevitably loses intimacy, and relationality.

The role that the major online companies play in shaping the form of digital content is crucial: together, they produce most of the infrastructure for digital publishing and thus the content produced. This infrastructure determines space through the length of posts, and memory, and through the availability of previous content—subject to search tools, for example—all of which significantly affects the time we spend reading.

The particular reformulation of space, time, and memory in publishing that these platforms enforce defines a new way of publishing, shaped by the ubiquity and immediacy of the networks and the algorithms that strongly encourage their extensive use.

The Endless Paradigm of Instant Publishing

This digital publishing infrastructure differs from traditional publishing in several characteristics. Two of these are the most crucial. The first is that digital publishing is *instant*: a single act of posting/publishing is immediately shared with anyone who follows or subscribes to that particular stream of content. But it is also instant in the sense that the moment one of these forms of content is published with one gesture, it is technically

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and conceptually "published." Even though there are some technical processes to change it, there is an instantaneous dissemination that cannot simply be redrawn. This goes beyond the concept of real time: even if the dissemination is mediated by the dissemination guidelines of the respective platform, it is delivered directly, and instantly, to the private platform spaces of the connected followers. This incredibly fast pace of publishing and individual content delivery is reinforced by the impressive simplicity and immediacy of its form, created by a text box and the upload of some media, reaching a portion of the public instantly. Filling in the forms and pressing the "Share" button is a rather simple gesture that has become so frequent and neglectful after being experienced hundreds or thousands of times. So, its pace also influences its length, which tends to be quite short.

The second characteristic is that instant publishing can technically be *endless*, as it is based on large-scale communication channels and storage with a fast response time on the network. However, because it is structured in a scrolling manner, especially on smaller screens such as smartphones, users are exposed to an increasingly limited amount of content that needs to be read and consumed even faster. It then becomes *endless scrolling*, with our fingers, often the thumb, in particular, to recursively spin it.

In this configuration of instant and endless publishing, our attention is increasingly caught in a loop. We endlessly search for more content as it is endlessly offered to us. And we keep looking for more, having consumed some that we find valuable. This process has been described by B. F. Skinner as the "variable ratio schedule of reinforcement," which triggers a specific psychological mechanism that randomly rewards the user as they perform and/or respond to a series of sustained interactions or stimuli.[26] The slot machine is a classic example of this. It rewards the customer in a completely unpredictable way. The machine engages the player until an external event occurs, such as when they run out of money, or decide to quit, or, less likely, when they win. Once content publishing becomes endless, we are exposed to an endless series of structured information for which we also happen to be rewarded, and our behavior is reinforced. Reinforcement also comes from the information that is stored, monitored, and selected by the various platforms to reflect our interests based on our previous browsing activities, which are then presented to us again.

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So, since we do not know when the next interesting text, photo, or video will appear, we keep scrolling, and we start again after we have dedicated attention to something we think is worth seeing. The randomness of the reward is key. It keeps us hooked and it's not easy to break this cycle because, psychologically, if we stop, we could deny ourselves the next potential reward.

This sense of potential denial and "fear of missing out" in response to repetitive stimuli has become so commonplace that it affects the *neuroplasticity* of the brain. What we do repeatedly affects the function of our brain, so we may find that certain circuits in our brain are strengthened by the repetition of a physical or mental activity. In our relationship with technology today, what we do is "alter the chemical flows in our synapses and change our brains."[27] This adaptation of our brains also gradually changes the way we perceive the space of publication. In the endless flow, scale and time are stretched to move closer to our perceptual boundaries and subjugate our attention. The "ecology of attention" was very different in the Middle Ages, when we were exposed to "a very limited number of discourses (the weekly sermon), images (religious frescoes and paintings) and spectacles (passion plays, jugglers, wandering musicians)."[28]

This information was original and unique and was therefore experienced in a physically defined space and usually at a similarly defined time. After the invention of media that could be reproduced by machine, first printing and then music, the exposure to information increased dramatically. And since then, of course, the amount of information we are exposed to has multiplied exponentially. This has affected our brains, our attitudes, and our attention span. We should also consider the qualities of the interfaces we use on our digital devices, which are despotically, and periodically, changed by the industry. These interfaces are the temporary *mediators of our attention*. What we do, or how we engage, changes our behavior. Our attention is synchronized with, and held by, the endless spectacle of short content, looking for quick fix highlights, which negate a need for longer content that requires our attention for longer. The biggest risk is that the metaphor of "surfing," created at the beginning of the Web to describe the hypertextual switch from one context to another, becomes the prevailing norm, where there is not even a shift but only a continuity of a stream. It is also important to consider the ratio between

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the amount of information we can process simultaneously and our attentional threshold, which has been a concern studied since the 1970s. H. A. Simon, who is considered the father of the "attention economy," wrote that the relationship between the amount of information we can process and the attention we can devote to this activity is that "information consumes [. . .] the attention of its recipients. Hence a wealth of information creates a poverty of attention and a need to allocate that attention efficiently among the overabundance of information sources that might consume it."[29]

Furthermore, Daniel Kahneman explored the limited nature of our attention using "capacity theory," which explains that with regard to "man's limited ability to carry out multiple activities at the same time, a capacity theory assumes that the total amount of attention which can be deployed at any time is limited."[30] The combination of these various elements in the current media landscape describes a rather dystopian scenario: we consume a disproportionate amount of information through the psychologically addictive mechanism of variable, random rewards; we then become hooked by scrolling through endless streams of information that our brains are biologically altered to permanently adapt to, gradually eroding the limits of our attention.

Given this publishing ecology, print becomes a limited, proportional body of information that is not based on rewards, usually requires more time and commitment for its consumption, and perhaps does not challenge our psychological attention mechanisms. It is a slow, archival medium, and its finite scale would probably help it rise again to become a luxury medium, as it was in the early days. Its different publishing ecology offers the possibility to focus on and master the content by moving autonomously within it, thanks to the spatial dominance of the reader, who can assess the content without restrictive interface mediation. In this sense, the recent downward slide of the electronic book format, which in the past was touted as one of the most promising digital commercial products, seems understandable, as it has been conceptually overtaken by the endless paradigm of content but without competing with physical publications in terms of luxury.

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Recording and Remembering the Endless Stream

The uncatchable infinity of Internet content, with its potential "recordability" in its own digital structure, can be imagined in what Orit Halpern calls "absolute storage, [or] the ability to save everything."[31] Digital media are fragile; in their original format they are relatively useless to preserve, and given the long-term threats of preservation, storing them in their own format seems only high risk.

However, if we consider recording digital media on analog media, in a process that would crystallize the ever-changing digital flow into an accurate photograph, we could imagine being able to freeze scrolling and transform it into a solid and stable form. Such a process would allow for an uncluttered overview of the content. So instead of constant interruptions from updates, notifications, and so on, one would gain some space, even if only superficially, to engage with the context that one might otherwise have missed, to take a step back to make sense of the content. An effective strategy for creating an analog picture of a complex and structured digital process is to look at a limited period of time and

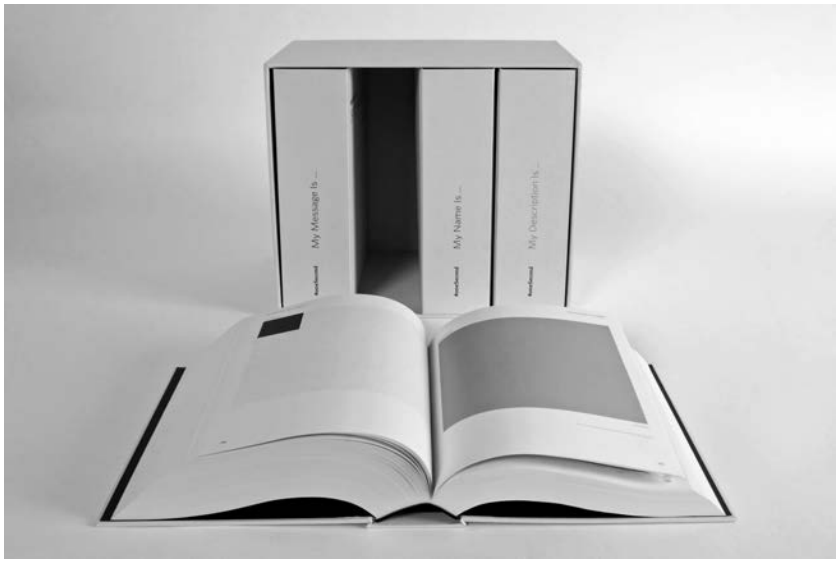

Figure 4.4
#oneSecond by Philipp Adrian, 2013. philippadrian.com and hello@philippadrian.com.

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represent the entire online production of the data under consideration in that time interval on an analog medium. For example, it is possible to explode the invisible, simultaneous online production of texts in a circumscribed environment over a very short space. Philipp Adrian used this strategy in his *#oneSecond*, sorting and printing out in a structured way all the tweets posted in one second, precisely 2:47:36 p.m. GMT on November 9, 2012. He collected 5,522 tweets and then categorized and examined them in various ways, such as by authors, colors, popularity, and identities, and incorporated the results into each of the four books produced, which total over 4,500 pages.[32]

The number of pages produced clearly shows the paradox that naturally arises in the physical weight and space requirements of the work compared to the insignificant amount of time (one second) the content expresses. I would definitely like to compare this work with *0.01s: The First 1/100th Second of 1-Bit Symphony*, in which musician Tristan Perich documented the very first hundredth of a second of his computational

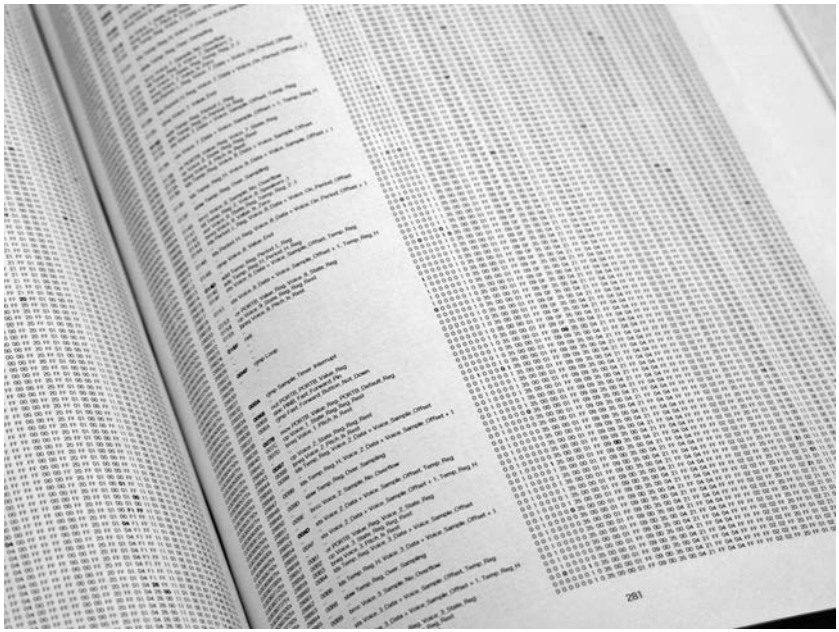

FIGURE 4.5
0.01s: The First 1/100th Second of 1-Bit Symphony by Tristan Perich, 2014.

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1-Bit Symphony, an autonomous generative music machine, in a seven-hundred-page book in 2014.[33] The book documents in detail the instructions, processes, calculations, and memory states of the computer executing the musical work through a systematic graphic design that unfolds the entire work in its many aspects. In both cases, the authors take a descriptive snapshot of a complex and extensive digital process that is part of the respective endless streams of digital information, which might just disappear.

Both artists use a traditional analog printed page, but for a similar kind of archival practice we can think of digital photographs printed on photographic paper, or digital publications recorded on cassettes, or digital films recorded on videocassettes, all reproducing the original content in an analog archival form. The consequence of this is that analog media validate and potentially deconstruct digital content by revealing its entire size and structure in a permanently visible configuration. This is especially true of social media, as it relies on the immediacy and ephemerality of the fluid, endless digital state. The photographer Robert Polidori summarized this as: "Digital is made to forget, analogue is made to remember."[34]

The digital from is quintessentially ephemeral in its own transitional nature from temporary states of electronic memory whose output is visualized in a temporary configuration of pixels on a screen. And if the recording of digital on analog media can unfold its unexpected size, thus revealing the enormity of the digital content once it is translated and revealed in analog coordinates, there is another dimension that affects our ability to deal with an endless stream of information: remembering.

The endless structural flow of information as digital content is meant to grow and evolve with or without our intervention. If we look at it from a purely temporal perspective, it is a constant, ever-changing present. We perceive it as moving faster than our own present because it scans reality in many other spaces and directions and brings them back together in our digital space, our single screen. Because it changes so quickly, our senses find it difficult to keep up, especially in the demanding environments of social media with its bidirectional nature. Here we are teased, tempted, or sometimes provoked to respond to a certain content, and when we do, we make ourselves vulnerable, expose ourselves, and "publish" our inner thoughts in an "emotional pornography."[35]

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All these activities drastically reduce the time we have to pause and reflect, thus challenging the way we remember the content we are exposed to. This content, which meaningfully increases over time, makes it clear that we need to filter it much more intensively. The process of remembering requires retaining information over a longer period. So, on the one hand, there is more work involved, which is more exhausting, and this puts a strain on our minds, while on the other hand, we are increasingly *outsourcing our memory* to digital sources, for example through our smartphones. We do not have time to fix memories, but we collect many temporary memories, and sometimes store them digitally, in an apparent effort to remember as much as possible. But it is not our brain's job to remember much, because memory is selective. This tension between our ambitions and contradictory practice is explained by Pierre Nora: "Modern memory is, above all, archival. It relies entirely on the materiality of the trace [. . .]. The less memory is experienced from the inside the more it exists only through its exterior scaffolding and outward signs."[36]

He emphasizes the desire to fully preserve the past, which is also not a concept exclusively related to digital technologies. It refers to the understanding and possible overcoming of our limitations and, in particular, our ability to preserve what should naturally disappear. If we take memory, and thus the concept of preservation, to the extreme, we can even consider pathological conditions inscribed in our biology, such as hyperthymesia, where people remember an abnormally large number of their personal life experiences and end up living in a state of mental discomfort. Jorge Luis Borges described this paradoxical condition in his 1944 story "Funes the Memorious," in which Funes, the protagonist, is doomed to remember literally everything.[37] In the course of the story, his inability to forget overshadows his own life and slowly destroys it. Here, memories are formed and solidify in his mind, whereas our experience is the opposite: we have many volatile memory states in which our brain adapts to this new condition and outsources the storage of the overflowing information to other volatile media, which are also digital. Is it possible to create any kind of authenticity out of something indeterminate and transient, out of such a vast and ever-changing structure of content, characterized by its indeterminacy and ephemerality and determined by the short-lived pleasure of turning the page?

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Scrolling: Again

So let us focus on the act and structure of scrolling. Scrolling information in an endless stream is like swimming in an overpopulated river with many bodies swimming in the same direction. To swim successfully here, you must concentrate and rely on your reflexes to navigate the river without colliding with others or drowning. And although the waters are constantly changing, as Heraclitus noted, "you cannot look twice at the same river; for fresh waters are ever flowing in."[38] It is a living environment where there is never the same thing twice. Programmed algorithms change the content and order of information, even if the user reloads it immediately, to make it more attractive and to better test and profile the user's interests.

The "changed" and the "new" are more attractive to our senses, especially on a small screen, as they alert us that something has happened. So to be effective, the endless stream of information needs to be constantly changing. This becomes clear when you watch continuous videos, where the flow of information induces a state of concentrated passivity even without the aid of a scrolling device. In social media, we largely and consciously leave the decision about what content we can read, see, or

Figure 4.6
Substitute Phone by Klemens Schillinger, 2017. Photo © Leonhard Hilzensauer.

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hear to the social media proprietary algorithms. And we scroll through digital content usually with a simple and single gesture, which is usually performed with the thumb. Similarly, we scroll through the next/previous channels on TV and through play/pause/stop actions triggered by a remote control. Oddly enough, we trigger TV operations with a similarly simple gesture, usually also performed with the same thumb.

These repetitive gestures performed by the thumb are expressions of a basic, instinctive interface. In the medium of TV, these gestures have proven to be the most pervasive ones, as the interfaces are so natural that they are almost invisible to our subconscious and the gestures are mostly performed instinctively. In the 2017 photo *Substitute Phone* by Klemens Schillinger, we can experience the essence, and specific dynamics, of this interface sublimated.[39] The artist makes abstract wooden objects the size and shape of an average smartphone with a series of sliding wooden spheres. They are designed to allow the user to repeat the repetitive gestures they make through the smartphone's interface, specifically scrolling and sliding, in an abstract way, without triggering any consequences from the software but only with a metaphorical awareness of the gesture itself. Here the focus is on movement, with an elegant design that eliminates all other distracting elements, making them look like a therapeutic, health-related tool, and which the artist describes as incorporating "calming limitations."[40] They are purposeless, detached from any process other than being perpetuated physically, and are meant to contrast with the "exciting" or "nervous" gestures associated with endless scrolling. These contrasting qualities are clearly linked to the presence or absence of content and to their own properties, including the ability to visually reshuffle different time periods through visual associations.

Visual Nonstop Online Time Travelling

The form of endless publishing is culturally reinforced by the possibility of going back and forth in time, visually, in terms of content. This is a significant change, because before the mass mechanical reproduction of culture, the past could be accessed mainly only by visiting libraries, archives, and museums in person. Now that mechanical reproduction has become instant digital reproduction, the visual past is literally ubiquitous. On the one hand, cultural institutions are investing time and resources to

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digitize significant parts of their collections, to make them more accessible and to make their cultural assets visible to the public. On the other hand, the popularity contest on social media, which is about the number of followers and images shared, leads to a *culture of exposure*, which in turn encourages the sharing of images with a certain targeted aesthetic. In addition, it is becoming increasingly easy to digitize content from printed sources from all eras. This leads to a remarkable number of unpublished photos and documents that can then be shared instantly online.

From the viewer's perspective, being exposed to visually consistent material belonging to very different time periods is a rollercoaster ride of perception, potentially addictive. This is particularly evident in the small galaxy of curated cultural and visually oriented accounts on various platforms that may or may not be related to social media. Their succession of frequently updated images that are stylistically consistent with minimal or no references is also perceptually endless, and the imagery used, usually aesthetically, bears the space in which it was created and the time in which it was produced. We are not used to this kind of exposure, at least not with such endless possibilities that fluctuate back and forth in time. Visual culture–oriented accounts reflect the user's curating capacity to visually connect disparate material and cross-reference it, often from different eras—the more diverse yet coherent, the more fascinating.

The mental consequence is to mine our ability to focus, fulfilling our visual pleasure, and our ability to constantly create new connections, to travel aesthetically anywhere and anytime, while also being influenced by our personal memories. This ability to mix elements from different fields and especially from different eras seems to be a typical attitude of the twenty-first century. From food to perfume, from fashion to architecture, from avant-garde to ancient artifacts, often dressed with plain pop when not pure kitsch aesthetics, these visual sequences, while everything becomes consumable in the instant, embody a *flow* in their scrolling structure. It is a pop-up media archaeology that digitally reproduces an incalculable amount of historical material. In perspective, this scenario recalls the relationship between the book and the telegraph described by McLuhan in *Counterblast*: "Gutenberg made all history SIMULTANEOUS: the transportable book brought the world of the dead into the space of the gentleman's library; the telegraph brought the entire world of the living to the workman's breakfast table."[41]

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Unfortunately, this also leads to a collateral effect that has some risky consequences: these contributions are primarily intended to be perceived visually and consumed quickly; they serve primarily as an attraction in the continuous flow. As a result, they usually do not contain an original reference and only occasionally indicate where they were reblogged or posted from. Worse still, the references of the various materials are quickly copied and pasted, producing a result that is incomplete, inaccurate, or just plain wrong but accepted as authentic after being quickly disseminated. This gradually leads to a loss of reliable references, which over time could undermine the traditional definition of history.

In the process of the digitization of everything, the loss of sources is still a problem for art institutions, which instead present their collections online with accurate data from conservators. But these institutional efforts are just a drop in the ocean in the much larger world of visual sharing and, unfortunately, completely disconnected from more reliable institutional approaches. These accounts and repositories have accumulated a remarkable amount of material, especially over the last few decades, but accuracy is far less important than aesthetics in these cases. Regardless of this instant publishing practice, which is unordered and almost unreferenced, a chaotic global visual discourse is emerging that definitely deserves to engage with institutions to jointly create reliable and possibly systematized online access to the visual past and present.

The Limits in Reading Capacities

In this scenario of overproduction and the ever-present danger of visual addiction to information flows, it is also important to understand our limitations. Even though our brains' neuroplasticity periodically adapts to new interfaces and visual structures—even endless ones—and to changes in the information formats we consume, our ability to read has not evolved or increased at the same rate. While statistics show a huge rate of instant publication, an empirical estimate of the total amount of books one can possibly read in an entire life is still around six thousand.[42]

To adapt to the new paradigms of reading determined by the Internet and social media, we have shortened our attention span in an ecology still based on "the scarcity of the capacity for the reception of cultural

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goods."[43] It is not possible to expand this capacity quantitatively to accommodate more content as industry has done with the global commodity market, increasing the capacity to buy, while in parallel some of the commodities themselves have been dematerialized, leaving the whole market economy of online services in constant growth. So, with attention and reading capacity insurmountably limited, the industrial strategy has shifted to something else, namely to conquering as much of both as possible. Hence, we have the psychologically demanding structure of the endless flow that accomplishes this task. But we can also see that areas of the screen other than content are also competing for our attention. Advertising, for example, is now said to encroach on the same reading space and vies for attention in this flow, capitalizing on strategies designed to gain loyal followers. Traditional media, such as the major newspaper websites, on the other hand, still design their platforms in a constrained space and in a more traditional hierarchy, possibly helping to maintain consistency with their identity and the visual feel of their older print-based systems. Finally, print by definition cannot be infinite, as there will always be a finite number of natural resources and, more importantly, space cannot grow beyond a certain ratio. This is another reason why it is potentially becoming a luxury medium: because it sets qualitative and quantitative limits that need to be understood and adhered to.

Everything Is News: Fragmenting Information to Digest More

Instant publishing seems to be conceptually shaped by a particular form of publication: the news. The social significance of news has often been highlighted by artists, such as in Hans Haacke's historical work *News,* which consisted of nothing more than a telex machine, installed in the Kunsthalle Düsseldorf, which continuously output printouts from the German press agency DPA (Deutsche Presse-Agentur).[44] The printouts were on display for one day, and on the third day they were all labeled, dated, and stored in plexiglass containers. Now it looks like a metaphor for the endless stream of news/posts/dispatches and the difficulty of accessing this history after a short time. The lack of prolonged attention, hence the brevity, and the title or subject as the only semiotic filtering elements apart

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from some surviving tags and metatags, increasingly shape the content in the most classic news format. This creates an increasingly homogenized, communicative stance in posts on social media and also in online-only advertising, some of which is also codified as (sponsored) news.

It seems that we are now thinking in a way that reflects a habitual scanning of short text arriving from multiple sources, which is what Nicholas

FIGURE 4.7
Hans Haacke, *Nachrichten* (*News*), 1969 © Hans Haacke, Installed at "Software," Jewish Museum, New York, NY, September 16–November 8, 1970. Società Italiana degli Autori ed Editori (SIAE), New York. Courtesy of the artist and Paula Cooper Gallery, New York, Photo: Hans Haacke.

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Carr refers to as the "staccato quality effect" affecting our brains as a consequence, showing how this way of reading makes a classic news structure very attractive.[45]

The news format has special qualities. It can be short, so that it can be consumed quickly in the current overcrowded mediascape. But it is also constructed in such a way that it solicits excitement and attention, if not tension, in the reader, through appealing headlines. Writing such headlines has recently become an overly popular practice, following the rules that define them as "clickbait" headlines. Clickbait is the style typically used in Web content to get readers to click on a link. It involves a basic psychological technique of teasing or promising exceptional content through some strategic elements designed to create high expectations in different ways, such as abruptly interrupting a description, for example, "On the sex scandal, the Prime Minister says . . .," or anticipating the reader's reaction, as in "This video of a lion attacking a zebra will blow your mind." This practice has become very popular, as it has proven to be incredibly effective in enticing readers through the right combination of text and images. It has become such a paradigm that even traditional media like television, newspapers, and magazines are affected by it on their websites. They formulate headlines that mimic them, offering a floating promise of unmissable elements that can be accessed by simply clicking on them, serving as both a reference and a summary of the entire story. In instant publishing, amateur and professional journalism are gradually converging on pure communication strategies to survive in the face of huge potential competition. Clickbait strategies have been semiotically tested in the past but in different fields. In advertising, for example, they have been coded as "teasing campaigns," and they also appear in the subjects of spam emails, which rely on a whole range of teasing strategies.[46] Historically, this increasing need of tension in the publishing ecology follows the dramatic increase in the format of breaking news after the establishment of 24/7 news channels on TV, just before the Web began to amplify the same format through the Internet.[47]

Thus, aptly sized in short formats, and from the personal to the media corporation's posts on their respective platforms, instant publishing is conforming to the news, if not to the breaking news, format. And in a publishing ecology that consists of an endless stream of short news, the two most important tools to catch a rare moment of attention are the

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visuals and the news format used properly. But this publishing is fast and fluid, and the time spent reading it is so scarce that some peculiar gestures are part of it. These include the dynamic of sharing a post with a headline from a news source after a cursory glance based only on a first impression of the headline without actually reading the linked content. A study on Twitter in 2016 put sharing headlines without reading the content at around fifty-nine percent.[48] The news format tends to be reduced to the headline, an image, and maybe a few keywords, which leads to a huge increase in sharing but also a highly shared, superficial perception of the actual content.

The pervasiveness and instantaneousness of news resonating through our digital devices is beginning to have some direct consequences. Often, news titles and promotional emails are framed as headlines. Decades of experience in crafting the right combinations of words and phrases in the newsroom, sometimes even by specialized staff like copywriters, has become a codified exercise in teasing that anyone can engage in.

In social media, driven primarily by the instant gratification of hits and likes, the *clickbait syndrome* has corrupted the diversification and specialization of communication, with the constant promise of revealing an intimate or universal breaking news content of some kind. We can thus observe a *newsification* of communication, where the desperate need for attention and feedback is in direct competition with each other and is fought out with all the verbal means necessary. The result is a general homogenization of tone and style that reduces this overproduction of content to Foucault's definition of an "incessant, disorderly buzzing of discourse."[49]

The Rise of a New Broadcasting Form

The instant publishing paradigm is based on the ephemerality of the published form, which is flowing. This fluidity, coupled with all the uncertainties about the long-term storage of digital content that is so prolifically produced, raises a fundamental question: Is the digital meant to store media?

If we look at the history of IT (information technology), the entire first generation of computers mainly used magnetic media and punched

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cards to store software programs and data. The data was primarily for the process of elaboration carried out by the software and aimed at the final output. Although their processual nature was dramatically innovative, the first computers remained confined to their purpose as sophisticated and scientifically oriented computing machines. Even most early computer art, like the computer art of Frieder Nake or Vera Molnár in the second half of the 1960s, which used similar but more contemporary electronic machines, produced results that were intended to be calculated and then printed out but were often not even stored in electronic form. So much of the programming code behind early computer art has not survived. Any idea of digital dissemination or of using the digital as a medium was only conceived in theory, such as the prototypes by Vannevar Bush and Ted Nelson mentioned earlier. The same is true for early electronic literature, which was mostly developed for special systems that ran on a local computer and were then printed out, like Nanni Balestrini's *Tristano*. Early computer music had a similar approach: its output was mostly recorded on consolidated analog media and/or maintained as code. There was no suitable magnetic or digital storage medium to store media content for several decades due to limited technology and lack of affordable storage space. Memory was used for programs, and possibly for data used for the process, or created after the process was executed. It is only with personal computers and sufficient storage space that we have media such as the floppy disc and CD-ROM, which are used to store media (text, image, sound, video) in the form of files and are intended to be distributed as such, even though this content requires a computer to be decoded and activated. But the uncertainty and fragility of storage, from the tiny holes in paper punched cards, to the impermanence of magnetization in tapes and discs, to the potentially peelable layers in optical media, and finally the nano-circuits in solid state storage, confirms that the role of the digital is an irreplaceable process rather than preservation, as all conservators of media art in major art institutions can sadly attest. After all this time, the storage of digital material still realistically aims to last, at best, a few decades, with the most effective preservation method being the duplication of as many copies as possible, of both the software and the original hardware, so as not to be completely lost. Any productive strategy that allows this material to survive the inevitable

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obsolescence and progressive failure of hardware and software proves its structural failure as a long-term medium.

Thus, if the digital has an embedded processual nature, which has escalated over time, its content has a highly transitory character, since it was originally and structurally intended to support the process and thus the computation, rather than to become a product in its own right. This is now also confirmed by the excessive production of content on social media and the Internet in general, none of which lends itself to being easily recorded or retrievable.

So, if the digital is ephemeral by nature, endless by structure, and easily scaled, then we have three essential elements that link it to an older form of media: broadcasting.

We can then think about how digital media has evolved as a new form of broadcasting. If we look at the original sequential nature of traditional radio and TV, we are now dealing with multiple channels with endless streams of content that are constantly being updated, affecting our perception of space and time as we move from one to the other. From the original distinction between general and specialized content, this new form of broadcasting is now evolving into increasingly customized content. For the average reader, it is transforming into an attractive echo chamber consisting of a tailor-made broadcast in which they are constantly twiddling their thumbs on an endless metaphorical wheel of what comes next.

The fragmentation of content, its dynamic quality, and its structural nature, which is not meant to be stored, are the perfect conditions for this new form of broadcasting, which manifests itself in the endless form of timelines, time-based content apps, and frequently updated pages. The endless structure is embodied in various ways, such as the software-controlled automatic reloading of newspaper pages or the automatic playing of the next related video content. All this content, which only appears to be available on demand, replaces the classic centralized broadcast streaming flow with independent, differentiated mechanisms and a maximum of individualization.

Finally, broadcasting does not necessarily mean remembering the involvement of a storage system. Broadcasting used to be a continuous but uncontrollable stream of content, which has evolved into a

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controllable but much more extensive stream. Even when we scroll the content backward or switch to another stream, we usually stay at the source, or return to it, to see the new content, usually forgetting the old one. The endless structure with its instant publishing paradigm provides temporary knowledge. However, the temporal and spatial limitation of this structure allows us to produce permanent and storable knowledge.

Rendering of Real and Digital Space in Artists' Publications

The perception of an endless amount of content is a dimension of perception that is understandably difficult to quantify. But any medium that can structurally transcend the finite nature of perceived space falls into this dimension. If we consider the printed page, it is not easy to find examples that would suggest infinity. Take, for example, the original paper "scroll" of *On the Road* by Jack Kerouac, typewritten in full immersion over three weeks in 1951. It is a 36.6 meter long roll that, once unrolled, visually shows the continuity and uniqueness of the writing process.[50] Not only does it perfectly reflect the stream of consciousness that is at the core of Kerouac's writing, but it also linearly explodes the space of the final laid out printed pages that millions of readers have experienced. In a sense, the scroll form breaks up the page format prematurely, in line with the content, which is intended to bring about both continuous writing and to induce a continuous reading concentration. This whole system is very different from the scrolling of the ever-changing digital streams, as it is finite and static beyond its size.

If we look at the way artists use the medium of the book, we can understand printed publications as archives, finite repositories of elements collected, stored, and validated on the pages of the publication. This concept of an archival book was taken up early on by artists. One of the first recognized books by modern artists, *Twentysix Gasoline Stations* by Edward Ruscha, was compiled in 1963 as a collection of photographs of gas stations he had seen during a trip from his home in Los Angeles back to Oklahoma City, where he had grown up, to visit his mother.[51] The book stores these images like a personal memory album that becomes visually abstract and transforms into a universal memory shared with all motorists who were

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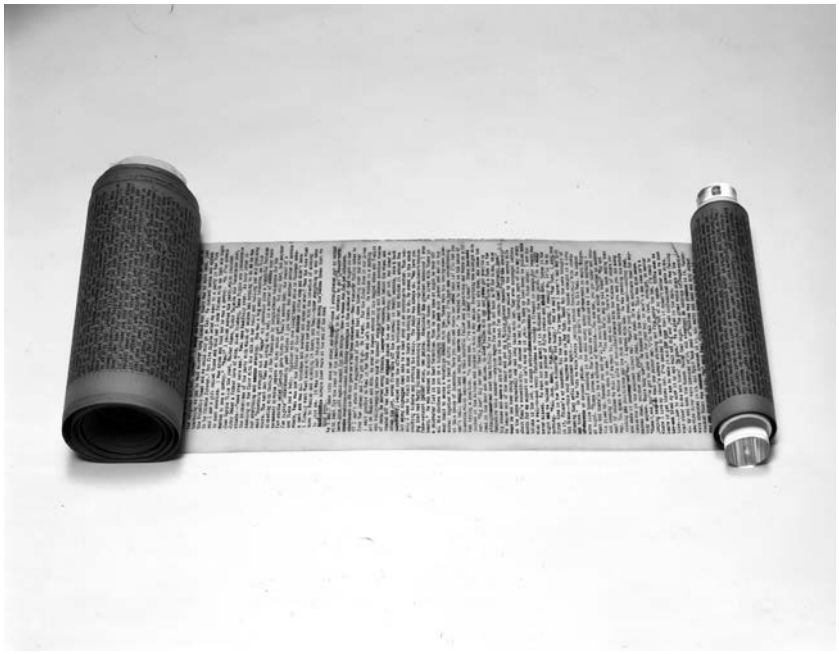

FIGURE 4.8
Typescript scroll of *On the Road,* 1951 (print)—Kerouac, Jean Louis Lebris de (Jack) (1922–69).

familiar with the gas stations depicted. This shared personal archive also becomes a continuous sequence on a defined path, that is, an analog static stream that will eventually become public.

Numerous artists over time have adopted a similar approach, using the limited space of pages to accumulate coherent content that has become a personal archive of reference. In today's postdigital dimension, the vast number of online images provides an enormous source of visual material for artists, so the concept of a printed publication as a visual archive of the digital has been revamped. Among the many visual examples, there are only a few that instead use a computational approach and document the process and the data generated without images. For example, in the 2008 work *Path*, artist Kate Armstrong printed a twelve-volume artwork with text generated by the physical movement of an anonymous person living in the city of Montreal between 2005 and 2007.[52] Every time this person accessed the Internet via public Wi-Fi over the course of those two years,

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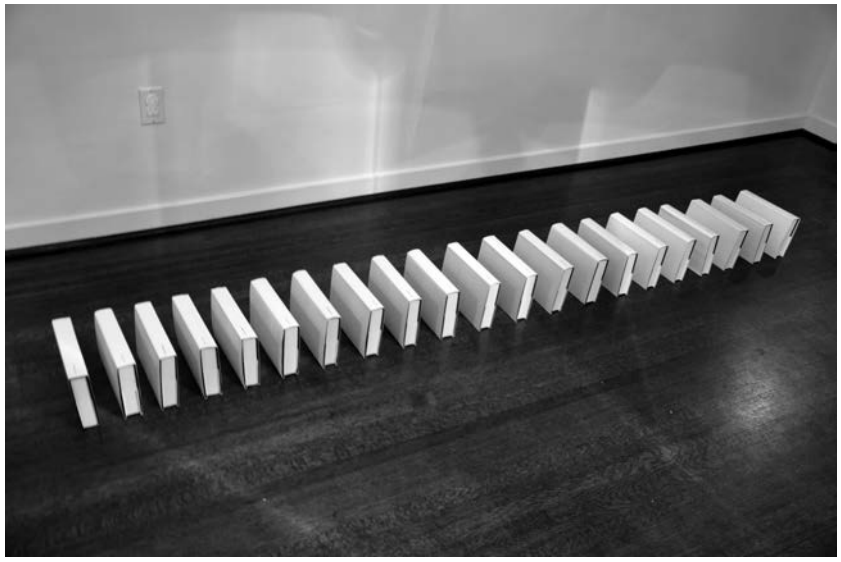

Figure 4.9
Path by Kate Armstrong, 2008. Courtesy of the artist.

they were tagged with a passage of text dealing with visual, personal, and spatial patterns reflected in the lives of fictional characters. The data stream is even more abstract here, but it narrates the urban context and reflects a continuous activity whose space is reproduced in several volumes, translating the flow of the space traversed into the sequential space of the paper.

The representation of a continuous space on paper, explored over time, is also what *1 the Road* by Ross Goodwin does. Following Kerouac's aforementioned tour de force, Goodwin programmed a computer to use various data streams to write an automatic narrative on a drive from Brooklyn to New Orleans.[53] His car was equipped with an external swiveling surveillance camera, a GPS unit, a microphone that recorded conversations in the car, and a clock, all of which delivered real-time information to Word Car, a trained neural network software. Goodwin devised a whole system capable of processing and extracting data in a coherent and readable form. Here, the various technological information streams that we naturally perceive with our various senses are interpreted and reported. The journey is rendered through a synthesis of machine "perception" with very brief descriptions accompanied by timestamps, sometimes with an

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FIGURE 4.10
1 the Road by Ross Goodwin, 2018. Courtesy of the artist.

unexpected literary accent, sometimes simply verbalized from the data. The journey through the entire space can be followed with a hint of passing time through the archival pages in a mediated flow.

These works translate the fluid and vast space interpreted by the digital, which is constantly changing, into a static, voluminous presence as a sequence of abstracted "snapshots." This process can rapidly escalate when we attempt to reproduce an entire snapshot of a considerable digital system, as in *Print Wikipedia* by Michael Mandiberg.[54] This artwork quantitatively surpasses all other attempts by artists to show the paradoxical size of books that emerge after online content is printed. He printed 106 of the 7,473 volumes of the English language Wikipedia as it existed on April 7, 2015, and added a background image to his installation showing 1,980 additional volumes. A 36-volume index of all 7.5 million contributors to Wikipedia is also part of the project. The printed volumes contain only the text of the articles, as images and references were intentionally not included. The overwhelming scale and effort of the project provides a balance between the explosion of content in its physical form and its representation. Just looking at the volumes produced is impressive, and then thinking about the missing volumes, the iconographic data, and the impermanence of the whole is a clear physical statement about the

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Figure 4.11
Print Wikipedia by Michael Mandiberg, 2009–2016. Courtesy of the artist and Denny Dimin Gallery.

relationship between the digital structure of the intellectual content, its possible printed archival dimension, and the respective spatial coordinates and reliability of the content. Ultimately, the work has an almost useless impermanence, as Wikipedia is updated every second, which reinforces the frivolous archival dimension of digital content as it flows in a static repository like print.[55]

All these works were created according to a conceptual, mainly digitally produced process. But their ability to be processed is their core quality, calling into question the relationship between the dynamic quality of the original content and its fixed output. The transfer from one publishing ecology to another is far from certain. The infinite stream of digital platforms producing ethereal content designed for a short attention span cannot simply be transferred to a finite number of printed pages. Even if we think of it as a photograph of a particular moment, it is not of consistent quality, even if it archives material that would have been lost due to this constant change, just like a traditional picture. Nevertheless, it materializes a dimension whose size explodes on the small screen,

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detailing and fixing for a long time the transitional information that moves from one digital memory to another in an equally fleeting effort. This uncatchable transitional nature, typical of digital publishing ecologies, is further evidenced once it is channeled into a traditional publishing ecology that contains it with all due constraints in an unmanageable space or structure.

Escaping the Endless Paradigm

The ephemeral nature of the digital system is based both on overproduction, partly machine-generated or assisted, and on structural fragility. It is the very nature of being digital: it is transient and essential, offering a wealth of knowledge that is technically only temporarily available in a particular machine state.

The endless paradigm, with its instantaneousness and abundance, can also be seen as a temporary manifestation of industry's control of our attention through a sophisticated form that has made us writers and readers in a content space that is uncontrollable on a personal level but extremely rich in content and attractive in form. Umberto Eco called for action against the mass media in his 1967 article "Towards a Semiological Guerrilla Warfare." He describes the condition of journalism as a practice that must necessarily fill the space of publication and be readable by a very general audience, which kills the freedom of the writer because "the contents of the message will not depend on the author but on the technical and sociological characteristics of the medium."[56] To escape these characteristics, he calls for a "semiological guerrilla" that promotes critical reception.

To contrast the endless publishing scheme and structure is to basically dismantle its founding principles and create something else, possibly equally attractive. What is lost in the process are two essential human excellences: the ability to create limited and mutually supportive social connections, and the purposeful and limited sharing of intellectual content.

To remedy the condition of endless publishing, we would first need to regain the ability to focus, through a self-disciplined reading austerity that allows for a reduction of the complexity we are currently dealing with. This principle implies a number of practices such as creating public archives, sharing private archives, holding offline physical meetings to

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exchange ideas, self-imposing limits on the amount of content we read on-screen, and, most importantly, creating a horizontal critical capacity toward the shared content. The critical reception of Eco should be implemented in a scalable model and mediated primarily by individuals and self-organized groups.

Escaping dependence on volatile endless paradigms also means an opportunity to archive the most significant parts of digitally created and published content and to share these archives, possibly even interconnecting them together, creating both a basis for future memory and a structured critical view. As Franco Berardi affirms, our current condition is to be "at the point of intersection of countless semiotic flows that stimulates your attention and your perception of self."[57] Lost in too much interesting and diverse information, we become distracted by the ability to visualize, and even search, ad infinitum, floating in a limbo of minimal concentration. Our self-awareness is pushed in the endless paradigm to be isolated and dominated by the single screen on which the never-ending dances of content manifest. Restoring a collective critical reception would redefine access to content and reperceive temporal and spatial limitation as an opportunity rather than a fear of missing out. This approach would simultaneously strengthen our ability to read and remember, and ultimately reclaim the space of content and its structure in a manageable and fruitful combination.

A crucial strategy for critically redefining access is the creation of limited, specific, and reliable repositories, supported by human editors at different levels from the personal to the collective and even intervening in the already existing institutional repositories. These repositories, essentially libraries, should experiment and possibly renew the calcified historical form of the library to evolve from a centralized archive of printed memory to a still finite dynamic node in the many different possible trajectories and ecologies of publishing.

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5

Libraries as Cultural Guerrillas

The Pivotal Role of New Libraries

In the publishing ecosystem, libraries have a very specific role: they provide free social access and guidance to cultural products for everyone and collect the printed literature of an edited section of culture. Technically, it is an orchestrated distribution and archival system and a local social network of the commons. The library is a crucial asset for society but also for publishing as a whole, as it provides a context and environment for its products. Libraries are the antithesis of the endless digital stream: embodying physicality, the gestural sharing of knowledge, which is the opposite of the isolated download, and limited, aspirational, long, and concentrated reading in contrast to the infinite automated stream of digital fragments.

Regardless, libraries are increasingly seen as redundant and outdated institutions because common sense dictates that everything is accessible via digital media and available via the little computers in our pockets that we still call (smart)phones. The idea that libraries can be compared to search engine results, for example, is superficial to say the least. This conceptually reduces an entire infrastructure of horizontal access and dissemination of culture, valuably accumulated and systematized over centuries according to democratic and scientific criteria, to the functionalist mechanism of search engine request/response controlled by mostly private and opaque algorithms. One should also bear in mind that search engines' online digital "answers" are full of ethical compromises conditioned by their business model, which introduces the inevitable approximations of more or less distinguishable sponsored results. The *instant answering* of search engines, when elevated to the almost exclusive source

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of new knowledge, dangerously neglects the vast web of knowledge connections patiently woven by researchers and librarians over time.

Contrary to popular belief, even among established institutions, libraries are still efficient systems for preserving and sharing knowledge produced to high standards, often simply not accessible online or not yet digitized anywhere.[1] Beyond any fetishism for the book as object, physical libraries also provide space to facilitate encounters between readers and with expert librarians. They create concrete opportunities to learn and improve knowledge in a more sophisticated way than relying only on algorithms or, worse, potential sales associations. Actually, the main argument against libraries is the reclaiming of expensive space; libraries often occupy prime real estate locations. In a general perception of indoor spaces as a place to use primarily digital facilities, the value of the relationship with physical cultural objects and with other people's bodies is increasingly diminished. The instantaneousness of the screen we are immersed in collapses space and mediates our relationships with both digital objects and other humans. It renders obsolete the perception of space to which we are biologically programmed.

Physical libraries are the outpost of a purely *social sharing* because they are inherently constructed as such a space, which can be amplified through an appropriate use of technology. This can lead to a flourishing of knowledge and relationships if properly evolved from their current *monumental framework*. In comparison, the much-vaunted digital libraries, while providing far greater accessibility, do not necessarily enable community building but often the opposite. They are technically focused on personal and bespoke devices tailored to digitally reflect and extend the user's self, never excluding on-screen interaction in favor of physical interaction. The vital role of traditional libraries as a central system for culture is transforming into a yet undefined new kind of cultural institution, with often uncertain attempts to incorporate digital technologies into the process or experiments in opening up the rigid silence of some reading rooms to other kinds of learning processes. But there is much more that can be done. If we consider the library system as one of the fundamental backbones of society, it can strengthen its presence by opening its contents to being temporarily relocated elsewhere and used somewhere else in pieces, so that new formations, collections, and repositories of knowledge can emerge, merge,

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develop, grow, and synergize in many different ways. Against this background, there has been a move to rethink the traditional and social role of libraries and make them an extended, networked, and shared knowledge infrastructure that facilitates social and cultural exchange. The libraries have been defined as "a network of integrated, mutually reinforcing, evolving infrastructures,"[2] or even as "an infrastructural organism, a data entity."[3]

They should compete with online-only knowledge and its corporate-filtered or populist-driven endless flow with their own temporal and spatial articulation, serving as focused showcases for publishers, possibly breaking with a lingering orthodoxy that leads them to avoid any relationship with publishers outside of acquisitions. The potential input and contributions from the publishing world can bring the public closer to the dynamics of editing and production and raise awareness of what "publishing" really means, both as a culturally selective process and as a sustainable endeavor.

Moreover, the traditional institutional library is not the only model. Its own evolution from an icon of twentieth-century democracy to a modern hub of knowledge transfer should be achieved by facilitating a confrontation and mutual influence through the spontaneous creation of different types of independent libraries, including artists' libraries, and the integration of new conceptual models that may, or may not, interconnect at some point to centralized library systems.

The emerging role of independent *custodians*, people who care for analog, and digital, libraries, and the emergence of DIY libraries, signal a strong need for these kinds of new processes. For example, artists are using the library form as an environment that is more codified and recognizable than a general archive, subverting or opening its structure. This dynamic, which already offers intervention strategies in libraries, offers enriching possibilities, including innovative pedagogical and social experiments, while rehumanizing and enhancing the role of the librarian as facilitator and expert.

The Library as a Monumental Asset

The contemporary concept of a library is multifaceted, especially in terms of different structural scales and scopes. The most popular, especially in

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the Western world, are the national libraries, which retain their historical role as visible national cultural assets. They are housed in monumental buildings that become the symbolic landmark of their contents: the cultural memory of an entire nation. Their architectural form must be reminiscent of a stable, long-lasting structure that reinforces national identity and symbolizes a secure shield for collective historical cultural production. Like historical or modern palaces, national libraries were built as architectural references to show their role as identifiable repositories and to reflect the importance of their collections in proving the perceived knowledge of the nation.

The association between the predominant architecture and the important quantity and quality of content, including the social role of preserving national cultural history and identity, have led institutions to invest in new outstanding library buildings, especially since the 1990s. The French National Library by Dominique Perrault, the Royal Library of Copenhagen, also known as the Black Diamond, by Studio Schmidt

FIGURE 5.1
The Royal Library of Copenhagen, also known as the Black Diamond.

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Hammer Lassen, and the National Library of the Netherlands by Karen Polder and Herbert van der Brugghen are examples of architectural landmarks, and sometimes even tourist attractions, that reinterpret the majesty of the national library through a modern structural organization and additional social services such as technical facilities and performance spaces. This model has also been applied to several newer libraries to further their social purposes. The remarkable Library of Birmingham by Mecanoo Studio, visible from afar with its structure on different levels and a filigree external decoration, is defined by the studio founder as a "public palace,"[4] allowing the public to read either inside or outside thanks to various terraces. She also affirms that libraries are "the most important public buildings, like cathedrals were many years ago,"[5] and comments on their ability to attract and gather significant numbers of people. The Hunters Point Library by Steven Holl Architects in Long Island City, Queens, is another example, built on a prominent site overlooking the East River and the Manhattan skyline. Holl explains that the library was programmatically designed as a community space and even an "engine of public space."[6] He believes that people need a place where they can physically interact, even in our digital age, where the library "becomes the consolidation point—the social condenser of a community."[7] Eun Young Yi's Stuttgart City Library is also a striking building in the center of the city, with its cubic form and transparent glass exterior structure. Yi explains in the official presentation brochure that "the library of the future does not exist primarily in the virtual world; the physical library building assumes a central function [. . .]. People need such real meeting places, which can be used [. . .] in a self-determined way, without restriction, without commitment."[8]

Finally, the impressive Tianjin Binhai Library by MVRDV Architects and TUPDI (Tianjin Urban Planning and Design Institute) is conceptually designed like a library and aims to be a cultural center. The most spectacular element is a huge mirror ball in the middle of the largest room called The Eye. MVRDV cofounder Winy Maas said: "The Eye hollows out the building and creates an organic social space. [. . .] a truly reflective and pensive environment."[9]

All these magnificent libraries were conceived to reinvigorate the relationship between their monumental nature and public participation. Yet

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these recent, very expensive public investments stand in striking contrast to a general funding crisis affecting most other large and local libraries. They represent something other than a purely functional public service: they become public architectural assets, contemporary monuments, and visual entertainment for foreign visitors, while their outstanding visibility casts a shadow over the thousands of cherished collections housed elsewhere. And they also take advantage of a rather attractive feature of libraries, their atmosphere and environment, which helps readers retain a certain mindset. In ancient libraries, the environment was carefully planned; high shelves stacked with books towering over the reader formed an invisible web, or labyrinth, of knowledge that, in the style of the sublime, dwarfed the human being amid the collection. A single person could never imagine attaining a comparable level of knowledge.

What remains to be ascertained in the controversial relationship between these libraries and the rest of the physical libraries' space is what their spaces represent in comparison to the similar digital spaces of the authorized and especially the unauthorized libraries.

Custodians and the Universal Library

In our postdigital world, the most popular economic assets include both huge architectural buildings, with their presence and real estate value, and equally huge structured, coherent Big Data, with its descriptive and analytical value.

From the latter derives the online dimension of digital libraries, both in their licensed and pirated manifestations. Most institutional libraries and archives have launched their own ambitious digitization programs to provide access to a variable part of their valuable and extensive collections, from the oldest fragile items to the newest copyright-free holdings. This often allows digital access to some rare content that would otherwise be inaccessible. And these digitization processes are announced by the institutions' communication departments to make their cultural assets more visible, to consolidate their reputation and status, and furthermore to reaffirm their timeliness. National libraries such as the British Library[10] and the National Library of Finland[11] are announcing their mass digitization programs to dramatically improve access to their collections and to create valuable public Big Data. The National Library of Norway[12] has taken

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on this challenge in the most extended way, as it has started a program to digitize its entire collection, including its holdings from the Middle Ages, which is estimated to take several decades. In the meantime, all users with a Norwegian IP address will be able to access every single digitized book, including those in copyright. This is the first example of a state-led complete liberalization of a large number of publications that are covered by copyright, challenging the assumption that digitization will exponentially infringe copyright legislations. The library is essentially a gateway to knowledge, in whatever form it is embodied, or as Jussi Parikka defines it: "a combination of symbolic and material conditions of access."[13]

The concept of the digital library emerges in response to the current digitization of everything, or every medium and every piece of content, fostered not only by the major institutions but also by the major online companies that are creating their own new kinds of digital commodities, such as Google Books, which, after multimillion dollar investments and partnerships with several national libraries around the world, was admittedly created not to be one of the most comprehensive digital libraries but to serve as the most sophisticated corpus for Google's text-based AI services.[14]

But if national institutions can decide on the content produced in their own countries, the holy grail of online access is the universe of extremely expensive scholarly publications affordable only to wealthy universities and institutions. Even though this knowledge was largely developed with public money, it is walled off by a few thriving private publishers who have capitalized on an efficient business model by charging fees to publish in their highly respected journals and then also charging libraries highly valued subscriptions to access them, again funded with public money.

As this content has passed into its digital dimension, it is vulnerable, like any other digitized content, to being instantly copied and passed on elsewhere. This is not a technical but a conceptual failure, or rather a misinterpretation of the digital system as a medium, since technically it is a transitory status in a machine, as pointed out in the previous chapter, rather than a storage-oriented content medium.

Over the years, several large explicitly illegal attempts have been made to retrieve and freely redistribute this kind of content, such as the renowned Library Genesis, or LibGen, with its tens of millions of digital

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publications, particularly focused on science and culture, or the related Sci-Hub, with its tens of millions of academic papers and articles. These two digital libraries face lawsuits, especially from the major academic publisher Elsevier,[15] which is one of the most proportionally pirated in these archives.[16] They keep changing their domain names and hosting to ensure continued access to their resources. The disappearance and reappearance of these databases has occurred with other collections in the past and seems to be a recurring gesture, from the very focused Aaaargh.org (offline now) and textz.com, to the giant Pirate Bay. Their controversial public presence is a powerful statement about freedom of access to science and culture and directly raises the equally highly controversial question of whether they can remain online. On the one hand, this statement is powerful and should prompt much deeper reflection on the nature of the digital medium. Indeed, these unofficial online libraries, even if technically simple and socially relevant, might not last long in their publicly accessible incarnation, as recent history has taught us. But even if they are legally banned and taken off the net, their collection will only be silently offline somewhere, and their parts will continue to be on millions of other computers and digital devices around the world. Copying is so much in the nature of the digital that if it is to be stopped, it must go against its own nature, with superstructural software processes that go against other basic software processes. Blockchain technology, applied to give digital files a patent on originality, including an owner and a timestamp, is an example in this sense.

Moreover, history teaches us that alongside these huge efforts to make millions of files publicly available, many others, less easily discoverable, are restricted or accessible only in small communities. In theory, we can imagine a decentralized rather than centralized approach to pirated content, where small groups of people would take care of small pieces of it. Historically, these structures were interconnected in networks of networks, with new distribution schemes sufficiently disaggregated and dispersed to include such numbers of people that they became a social case, which is inevitably one of the inherent claims of the pirate platforms mentioned above.

The multitude of specialized smaller collections have already been defined and technically quantified as "personal portable libraries."[17] They

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are considered primarily in their offline form, shared on a personal basis, and small enough to fit into portable storage or available only temporarily over a local network. They embody, sometimes unconsciously, one of Aaron Swartz's guiding principles in his *Guerilla Open Access Manifesto*: "We need to take information wherever it is stored, make our copies, and share them with the world."[18] It is a bold and risky statement that combines the universal technical feasibility of digitization and sharing with the variable dimensions with which this can happen, from the global LibGen or Sci-Hub, to the personal word-of-mouth of small collections.

Swartz's principle is also the rationale of the self-styled "custodians," a group of intellectuals who call citizens to action by scanning and freely sharing printed content they deem valuable. In their own words:

> We are all custodians of knowledge, custodians of the same infrastructures that we depend on for producing knowledge, custodians of our fertile but fragile commons. To be a custodian is, de facto, to download, to share, to read, to write, to review, to edit, to digitise, to archive, to maintain libraries, to make them accessible. It is to be of use to, not to make property of, our knowledge commons.[19]

The custodians' position raises the great question of access and, interestingly, not only as an institutional or intergovernmental problem but primarily as a personal one. In this regard, there is a principle brilliantly summed up by one of the initiators of this movement, the theorist and activist Marcell Mars: "With books ready to be shared, meticulously cataloged, everyone is a librarian. When everyone is librarian, library is everywhere."[20] This is a clear call for citizens to act and make some form of resistance to obstructed or centralized access. It seems that they are inspired by the strategies of the resistance groups in *Fahrenheit 451*, who take personal responsibility for the preservation of literature.

The task of the custodians is to preserve culture in digital form, not only for themselves but for the community. By breaking down the collection and the associated personal care of files to the interests of an individual and eventually to a group of collaborators, one reduces the risk of getting lost, even in the growing dimension of these huge bodies of culture as an accumulation of millions of items. The spatial and temporal dimension of the digital archive is well summarized by Geoffrey Batchen: "Now the archive is [. . .] a continuous stream of data, without geography

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or container, continuously transmitted and therefore without temporal restriction."[21] The vast online digital repositories can then be perceived mostly as a *nonplace* where knowledge in its encoded format becomes an alternative, entertaining escapade that seduces the reader into the classic scheme of search and find for quick gratification.

The paradoxes of such a size conflict were already described in Kurd Lasswitz's short novel *Die Universalbibliothek*, published in 1904, in which he imagines the ultimate library that not only contains all publications already printed but also attempts to calculate the space for all publications yet to be printed, on a combinatorial basis. This idea creates vertigo, as in Borges's famous "Library of Babel," which is based on Lasswitz's work, mainly because as soon as the quest for completeness is extended to infinity, we lose focus: "The figure is not infinite [. . .]. We can write down on a very small piece of paper the number of volumes comprising all possible literature. [. . .] But if we then try to visualize it [. . .] we realize that we cannot grasp what is otherwise a very clear and logical thought."[22] The number of all possible publications is thus finite and we can prove it by appropriate calculations, but it is so large that above a certain threshold we perceive it as infinite.

With the vastness of the digital world, we must resort to abstraction because we are forced to deal with the representation of a space that is never physically revealed. So, apart from the question of scope itself, there is another important topological question: Where exactly am I supposed to intuit or perceive the presence of a file? Normally, we refer to the device in which it resides, along with hundreds of thousands, if not millions, of other elements. While the printed word has a "locus," the digital word is an "ectoplasmic arrival and departure" to and from the screen.[23] And this lack of "locus" is once again one of the biggest cultural problems. But it gets worse as soon as we progress geometrically with the number of elements. Reducing the scale to something that our minds, senses, and even the first stages of perception can process would mean that we establish a different relationship. And then sharing the scaled-down cultural territory with other like-minded people would help bring life and usefulness to our digital productions and findings.

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Printing the Internet

If we try to come up with a number that represents all the knowledge produced, or the ideal *universal library*, we can come up with bizarrely large numbers. It is an all-encompassing abstraction that can help to find a scale for an intangible subject. In 1963, J. C. R. Licklider, in his book *Libraries of the Future,* estimated that the total printed knowledge held in the world's libraries was roughly one hundred trillion characters, or about 33 billion pages, and attempted to map out a plan for its computerization in the near future.[24] Since then, this computerization has become an effective and globally applied process called digitization.

And after all, we started producing digital content en masse as soon as the possibilities of online publishing became available. But once we started producing dematerialized culture, there were concerns about rematerializing it to ensure a longer lifespan of content as a possible basic safeguarding strategy. In particular, reprinting content that is only available in a digital format is one way of giving a permanent and discoverable form to content that could previously only appear on the screen surface of our devices. In the previous chapter, I discussed artists' strategies for archiving digital content in printed publications, but this whole practice is subject to scaling if we were to apply it to the entire Internet, as we would automatically produce monstrous figures.

Then the paradoxical question might be: If we want to print out the entire Internet, or better, the entire Internet at a given moment, how much paper would we need? Caitlin Dewey, a reporter for the *Washington Post*, has made a calculation in which she has compiled figures from various sources. She comes to the inevitably rather rough conclusion that we would need 305.5 billion pages to print the entire Internet on A4 paper, which, oddly enough, is not too far from Licklider's estimate of 333 billion total pages of printed culture in the year 2000.[25] This figure is probably just an estimate, depending on three variables: How many Web pages are there exactly, since there is no way to track, or know exactly, especially outside of what is indexed by search engines? How much content is hosted there on average? And how much content can we realistically print on a single page? This number is only an approximation, but at least it gives an idea of the enormous amount of content that we can access via small screens.

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Artist and writer Kenneth Goldsmith, a custodian and founder of the shadow library Ubuweb.org, has experimented with various artworks and essays on this particular dimension. One of his best-known performances, in which he openly acknowledges again the work of Aaron Swartz, is *Printing Out the Internet*, in which he asked visitors to the LABOUR gallery in Mexico City to print out at home what they wanted from the Internet before sharing it in the same gallery.[26] Around ten tons of paper were delivered to the gallery, and a reading marathon began, defined as a "reading of the entire internet."[27] Many visitors actively participated in the reading, but there were of course negative reactions after the media covered the story, including a spontaneous online petition calling on Goldsmith to stop the work immediately, as it encouraged excessive waste of paper without considering the environmental consequences. When confronted with the above figures in an interview, he replied: "we're dealing with abstraction and we have no idea what this is. We need new metrics for infinity."[28]

Infinity is a recurring concept, an abstraction of the invisible multitude in the digital publishing ecology, with a corresponding tension in the need

FIGURE 5.2
Printing Out the Internet by Kenneth Goldsmith, Mexico City, 2013. Photo © Marisol Rodriguez.

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to manage it through machines and systems. Attempting to govern and preserve infinity is what we so often do when using the screen-based digital dimension, even without the aid of metrics. Developing strategies that enable a shared collective mapping of the surface of infinity is a step toward a different relationship with the digital. Scalable networks created by a collaborative multiplicity that in some ways reproduce the interconnected infinity of the Internet, but with a decentralized and distributed structure, are the closest form to conceptually dealing with it. Take *Humanpédia*, a utopian project by David Guez that applies the basic strategy of circumventing censorship and collective preservation described in Ray Bradbury's novel *Fahrenheit 451* to Wikipedia.[29] He proposes that French citizens become "humanpedians" who memorize an article from Wikipedia France. He calculates that about one fifth of the population would be needed to memorize the entire fifteen million articles. Guez returns the power to oral tradition to preserve an important, collectively developed part of the Internet, to become a living, functional backup. The model represents a *conceptual reverse archaeology*, where the oldest medium (oral) preserves the newest (digital). But apparently there is no "new" medium after digital because it "remediates" all others and forces them to change.[30] All previous media must reformulate themselves and find their place in the new publishing ecologies created by the new media. Their role and weight in the media landscape must be rebalanced to cope with the digital, liquid, endless structure, and this is especially true of the sheer physicality of print and libraries.

Artists' Libraries

The library is not only a structure and a system but also a concept and an archetype for the organization and dissemination of knowledge. Its physical space is the meeting place between the contents stored and available and the interested readers, sometimes mediated by the librarians, who must also sustainably manage the system, especially the space and access, so that the library can dynamically thrive. The shared space enables a relationship of proximity with the librarians, the other readers, and also with the content. This system has been explored in various artworks,

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FIGURE 5.3
The Situational Library by Andy Simionato, 2013.

highlighting in particular the technical and social dynamics, as well as the hidden aspects, of the content available.

Giving up the role of librarian to the reader, for example, is a possible experiment that is easier to do with digital media. And giving the accidental participant the power to shape the library is a key element of *The Situational Library* by Andy Simionato, inspired by the Situationist movement.[31] He embodied his project in two different steps. The first was called *Swap, Drop and Roll* and consisted of setting up a library at the Perth Institute of Contemporary Arts with several thousand deaccessioned books donated by the State Library of Western Australia. The public could help shape this library by adding unwanted books to the collection, taking books away, and arranging or sorting them in certain ways. The library then changed its shape and inventory daily and was frozen in its last and final state at the end of the exhibition. The second step was to run a library of digital publications on a Wi-Fi equipped computer LAN (local area network) in the courtyard of the University of New South Wales's

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College of Fine Arts. In the same sense, the person accessing it could upload or delete files. The library was only accessible within 10 meters of the router, forcing participants to be in the same room. In both cases, local access is structured in contrast to universal access, and the horizontal qualities of participation empower the reader. In a more anarchic version of the library system, a space of collective management and responsibility is created, based on donated initial cultural capital. Furthermore, the possibility of coming across content that has been overlooked, the discarded books, in a shared space is tested for interest and possibility.

The concept of Meriç Algün Ringborg's *The Library of Unborrowed Books* is based on a similar, albeit posthumous, social commitment.[32] Ringborg collected titles that no one had asked to borrow, thus compiling a kind of library of completely ignored books. This exercise turned out to be a collective survey of tastes and interests through an arbitrary selection. It played on curiosity to know what subjects no one seemed interested in, even under conditions of free access. We can look at this work from a double perspective. One is about what is overlooked in large systems—the larger they are, the larger the base of ignored objects, as is often the case with large digital collections—and, also, what role this ignored material plays in reinforcing the validity of the remaining selection or highlighting obscure themes. The other can be interpreted within the framework of an aesthetic of failure applied to the library system: the glitch of zero popularity of individual volumes can only be understood when they are visually assembled in significant quantity, because together they form a ridiculous collection of unpopular topics whose reasons for failure might remain a mystery.[33] Similarly, it plays on the literary aura of the library, highlighting the tension of this unknown space of content and its obscure quality of unexplored culture. Libraries have many hidden spaces, so much so that they are depicted in films, for example, as "repositories of secret or occulted knowledge."[34]

This mysterious nature of libraries is often reflected in the libraries created by artists. They are structured to exploit the standard organization of a collection of *publishing ethnography*, often elegantly defying established cataloging rules and casting publishing practices in a different light.

The Piracy Project collection fits this vocational attitude perfectly and is one of the most fascinating and controversial artists' libraries.[35]

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It emerged from a broader project, namely a "platform" exploring the spectrum of "copying/re-editing/translating/paraphrasing/imitating/re-organising/manipulating of already existing works."[36] It is curated and updated by Andrea Francke and Eva Weinmayr. It is a quantitatively small collection of about one hundred and fifty books whose contents have been wholly or partially altered, appropriated, and reproduced using different strategies and under different conditions and contexts in different parts of the world. The curators are not using this unique collection as a showcase but as a starting point for public discussions and working groups that address the question of "original" authorship and intellectual property. This dialectic is a necessity, as each publication included has a specific history that needs to be understood beyond its aesthetics and form. From unauthorized translations that have had additional texts added and are then regularly distributed commercially, to plagiaristic literary experiments on the fringes of the law, to pure bootlegs of academic publications, to original unauthorized monographs with visuals sourced from a variety of commercial sources, to artists' interventions in classic texts, the collection is as diverse as it is coherent with its mission. The project attends to the intersection of critical artists' publications at the margins of activist cultural tactics. The catalog is available online with all the necessary references, but in the temporary exhibitions it shares its materiality and the associated value of producing and often disseminating a challenging and risky title. The shared space of dialogue becomes a collective critical consultation and contributes to the dissemination of controversial works by also stimulating a collective debate on the values that emerge from this collection. It is another participatory form of access to, and dissemination of, very specific printed matter.

This work highlights how the interior of publications, or the content they house, can be seen as a practice in which the power of the author is transferred to the reader, which in this framework grounds the experience that Foucault calls the "phenomena of the library": "The imaginary is not formed in opposition to reality as its denial or compensation; it grows among signs, from book to book, in the interstice of repetitions and commentaries; it is born and takes shape in the interval between books."[37]

This imaginary and the energy it expresses also form an invisible structure in the books, which can be perceived visually through the

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morphology of the library itself. The sculptural presence of the library has been used by various artists in their installations to exploit its iconic structure and all the symbolic values associated with it. Especially in installations, the library is often a sculptural declination of the classical artist's archive, a collection of objects with an invisible relationship attached to each one. While artist archives usually favor a heterogeneous selection of objects, artist libraries usually retain the recognizable structure of shelves and cataloged books, with a unifying concept holding the fabric of the whole structure together.

The Fountain Archives by Saâdane Afif dissects in its mechanisms a fundamental characteristic of the library: its intrinsic redundancy.[38] The artist collects publications containing one or more reproductions of Marcel Duchamp's iconic 1917 work *Fountain* and has amassed more than eight hundred publications since 2008. But she does not stop at collecting them. She tears up the one or more pages on which *Fountain* is printed and frames them to form polyptychs. She also carefully compiles an online catalog of her archive/library where each publication is

Figure 5.4
Installation view of Saâdane Afif's *The Fountain Archives*, Museo Jumex, 2019. Photo: Abigail Enzaldo and Emilio García.

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registered with a unique sequential number. The mutilated books are then arranged on shelves enclosed by glass cases, forming, in the artist's words, "an archive without its object,"[39] which is indeed one of the main functions of publications in a library. The redundant aesthetic of the work reproduces the image of one of the most famous and celebrated works of art, which, in its multiple scales, qualities, perspectives, and contexts of reproduction, emerges again and again from an entire collection of books. The form of this library is a *meta-archiving* of the historicization of one artwork by another artwork, which in turn performs the original existence of the other. Metaphorically, it can also be equated with the digital idea of a library, where multiple copies, or mechanical variations of the same concept, are created. But the substantial amount of work required here to assemble small amounts of similar content makes it clear that very different rules apply in the printed ecology of validation than in the digital one. Theoretically, a digital version with the same content, for example, would have dramatically increased the scale of such a project by assembling a much larger quantity of images. But this hypothetical digital version would eradicate some of the strongest qualities of *The Fountain Archives*: its presence, its historical underpinnings, and its visual perception as a whole body of work organized by an organic structure in the installation. Indeed, this configuration of a library does not imply audience participation through an active engagement with the publications. It is a surgical intervention on the books, extracting part of their common DNA and recombining it in redundant and linked sequences.

The focus of Yinka Shonibare's *The British Library* is instead the symbolic visual structure of a library, especially in the interconnected system of narratives and stories parceled out in various books on the shelves, waiting to be revealed to the curious reader.[40] He has assembled a library of six thousand hardbound books, bound in his own Dutch wax printed cotton textile in a variety of multicolored patterns. Each book bears the name of a British immigrant who contributed to British culture in gold foil on the spine, including celebrities such as T. S. Eliot, Zaha Hadid, Anish Kapoor, and others. In the installation there is an old desk with chairs and an iPad with the full list of names, additional audiovisual material, and the opportunity for visitors to record their own stories as immigrants. The 6,300 reclaimed books[41] reveal their own stories through the screen as

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a dynamic and updatable extension. As libraries condense the narratives of society, this artwork dresses books to sculpt a library of selected people who speak to each other through "reading" their own personal narrative. It can be seen as a peer-to-peer transmission that makes the visitor aware of a different, unbiased perspective on immigration while manifesting a system of cultural exchange archetypal of a library. The dualism of the sculptural books and shelves with the digital channels that contextualize and enrich the original content reflects the primary dynamic of open social information exchange in the library system.

In this work, the artist evokes the library without necessarily building a traditional library. He evokes the imagery of a library by projecting our expectations into the yet unknown contents and stories contained in the hosted publications. These materialize the archetypal potential of a library as a system for content dissemination and access that is already embedded in public perception.

All these artists' libraries develop specific dynamic tactics to undermine and shake the stable and codified library system by subverting its rules and hierarchy. They bring marginality to the center of attention by using personal criteria as curatorial statements and form as symbolic mediation. They show how the private perspective, combined with very different and unusual strategies, can trigger community-oriented dynamics and unprecedented forms of circulation. They *reconfigure the system* as a specific social space, using the public imagination, as in Shonibare's installation, to command its perception. They perform this imagination in their structure and invite visitors to participate in it. And they work mainly with the representation and narration of the content, keeping the main structure as a reference.

The Library as a Performative Space

Artists' libraries are assembled out of atypical materials, reflecting the artist's approach, mostly using the library's structure as a cultural archetype. But the library itself, acknowledged as a monumental, so also sculptural, entity, hosts a unique social space which is an attractive territory to be explored through performances. Indeed, because this space is strictly rule-based, as it is its organization, we can consider the patrons as the embedded

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omnipresent audience of the library. They can almost automatically turn, respectively, into a stage, a source for inspiring the performance script, and the audience of performative acts. As Anna-Sophie Springer states: the library is considered the primary public space for reading and is "thus a hybrid site for performing the book."[42]

There's a long history of interventions in libraries' books, as many librarians can testify. Sometimes the interventions had a distinctly subversive, as well as artistic, plan. The couple Joe Orton and Kenneth Halliwell, for example, borrowed, and even stole, books from libraries in the London Borough of Islington between 1959 and 1962.[43] Once in their possession, they cut out some of the illustrations, creating subsequently collaged covers for these books, which were then returned. The covers were created to host jokes and references to queer culture, from the allusive to the explicit. The couple was caught at some point and jailed for six months for "malicious damage."[44] They demonstrated the power of infiltrating a codified system and disrupting its own rules but using its own aesthetics. Through the manipulation of what is considered a standard communication, the cover of a book, in a public context, they were questioning the library's seriousness and consistency, its social and especially educational role, opening a subversive space of intervention. They also abused the perception of a common resource by redefining the circulation space of specific content to where it could serve the purpose to communicate itself, becoming a metamedium.

Similarly, the practice to intervene in the system with uncataloged material has been accomplished several times. The Canadian Institute for Infinitely Small Things collective, for example, left forty copies of their *New American Dictionary: Security/Fear Edition* in various libraries of Vancouver in 2006. The dictionary contained sixty-seven new American English terms related to the post-9/11 era.[45]

Library interventions have included playful additions added to the margins or inserted as extra pages of books, such as inappropriate notes, messages, drawings, or poetry. They exploit the fascinating quality of intervening in a structure that will host the intimate space of other unknown readers, who will be unexpectedly called to testify to the gesture and possibly validate it, through reporting it to the librarians or keeping it for themselves as a secret message passed from the artist to the reader through the exploitation of a knowledge sharing infrastructure.

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The simple tactical insertion of an extra element in books is what Caroline Delieutraz performed in *Google Marque-pages* at the National Library of France and Centre Pompidou Public Information Library in Paris.[46] Delieutraz inserted printed bookmarks in different classics of French literature waiting to be picked up on the shelves. The bookmarks had advertisements allegedly supported by the libraries that were aesthetically similar to the contextual Google Ads displayed on websites at the time. The ads were contextual to the content of the book they were inserted in. In Marguerite Duras's *The Lover,* for example, there was a bookmark with textual ads about love-related fortune-telling companies, wedding planners, and housekeeping services. The artist wanted it to become a collective action, too, so she made templates available for download, encouraging anybody to compose his own bookmarks in the same style and similarly intervene in other French libraries. Her action used the library content as a meta medium, materializing a new level of unauthorized content and entering it into the encoded life of these monumental libraries. This level was quickly materialized from online commercial logic and then physically reproduced and consistently placed into a coherent, dispersed network of books, which eventually assumed the role of an internal distribution platform. It shows how the library is a dynamic system, living not only through the codified handling of its own collection but with unpredictable small methodological turbulences. These performances resonate in Alberto Manguel's description of the library's dynamic qualities: "A library is an ever-growing entity; it multiples seemingly unaided, it reproduces itself by purchase, theft, borrowings, gifts, by suggesting gaps through association, by demanding completion of sorts."[47]

Penetrating the library system with controversial materials is a common strategy to perform a political act. Similarly, assembling, and transporting a small library in urban areas is in many forms a performative and strategic gesture. Mobile and curated libraries have become a common practice among artists and activists, especially when it comes to assembling small thematic collections to propagate and disseminate knowledge of certain issues. These are usually modified bicycles equipped with a minimal trailer that provides space for displaying and transporting publications on the street, and are usually targeted at marginalized or disadvantaged communities. An example of this is the *Bicicloteca* in São Paulo, Brazil, which uses a bicycle to distribute publications to homeless people

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FIGURE 5.5
Bicicloteca in São Paulo, 2011. Photo: Green Mobility.

without having to give them back, but with the invitation to share or give them to others.[48]

Once again, the character of the library as a social space becomes clear, linking cultural productions with a targeted disadvantaged community, coalescing different vocations and purposes from the traditional library to democratize knowledge and extend its reach. Dissemination occurs through a spatial intervention that instigates new peer-to-peer relationships within a specific group of people. In these nomadic libraries, the publications are a medium to create a shared space of communication between the "librarian" and the reference group. The publications mark the continuity of a sympathetic relationship established in a neutral territory, the street, where there are no forces of power at play, but where there may be opportunities for development and engagement. These relationships operate through a self-speaking medium, the publications themselves, which open social spaces like those of conventional libraries. These kinds of efforts are often undertaken voluntarily by active or retired librarians and are based on long experience with bookmobiles (discussed later in this chapter).

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The combination of the means of transport, the gesture of offering publications, and the street as a venue creates a specific social environment. The use of a controversial means of transport can create an equally controversial space as it influences the initial visual approach and subsequent communication. This is the process of a performance by Raul Lemesoff, an eccentric Argentinian artist who fits perfectly into the concept of bookmobiles, taking publications to where they are needed. He uses a converted 1979 Ford Falcon, the same model used by the Argentine military in the 1970s to make people "disappear" (the *desaparecidos*). Lemesoff has named his project "Arma de Instruccion Masiva" ("Weapon of Mass Instruction") and houses nine hundred books on it, all of which have been donated.[49] During his performances in Argentina, he spoke with people who approached his vehicle and became curious. He distributed books free of charge to interested people, with only one condition: that, like the *Bicicloteca*, the borrowers promised to read what they were given.

Taking publications to the streets to share them physically also means dismantling the monumental quality of the library and its centralizing role. It is a process of breaking down interests and focusing instead on different audiences. It is also about reducing size and complexity, diversifying the offer, and temporarily dislocating resources. Most of the above examples use the form and space of a library apart from its usual structure. Nevertheless, the social environment and the dynamics of cultural exchange that take place within a library are also addressed, albeit from a noninstitutional space and a different perspective.

A Different Cultural Topography: Independent and DIY Libraries

Understanding the relationship between readers and the cultural objects they read and share is the basis for conceiving alternative library models. The greatest potential in creating alternative libraries as a different cultural structure lies in reflecting undocumented, forgotten, underrepresented communities or cultural scenes. Frequently unadvertised and vastly unknown, they are accessible only by admission. Independent libraries assemble and house collections to provide an alternative to the traditional library system. They try to cover missed topics or comprehensively explore those that are only treated superficially elsewhere. Often,

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they also develop a different internal structure and try to improve the unforeseen connections of the hosted publication. Some of these structures build on overall concepts and follow more original, sometimes even extravagant, paths to link different materials, especially compared to the strict machine-based logic that characterizes the Dewey classification system or the keyword-based algorithmic indexes. Indeed, the number of possible meaningful connections in these experiments seems less predictable than what software normally detects through its computed comparisons. To contextualize a publication, the software usually uses a priori classifications and quantifications, such as the most frequent occurrences of words in the text and the categorization or, more generally, the metadata assigned to the publication by other trusted sources, such as Amazon. Meaningful links to other publications with different keywords or metadata are left to the irreplaceable knowledge and intuition of the librarian or fellow custodian. One of the most important unspoken reasons for building libraries outside the institutional framework is to express the freedom to collect and organize publications in a different way, alternatively to the digital accumulation of computer files of publications. Moreover, alternative libraries are often private. In the past, libraries were privately owned because books were in limited supply. With the development of movable type, which dramatically increased the number of books available, this situation changed exponentially, which in turn resulted in an unprecedented spread of culture. The first short-lived example of a European public library was created only a hundred years before Gutenberg and dates to 1452: the Malatestiana Library, which belonged to the municipality of Cesena, Italy.[50]

Another constraint to which institutional libraries are subject is the cataloging standard, the Dewey Decimal System, a universally accepted classification system. Trying to find alternatives to this crystallized system is a kind of statement for independent libraries in their effort to experiment with new classification paradigms beyond the standardized categories.

One of the first examples of unorthodox libraries is the famous library of Aby Warburg, founded in 1900 and based on a more general idea of a critical organization of knowledge. He structured his library in an undisciplined way, not as an act of rebellion but as an experiment in cataloging and reorganizing various publications. The overarching criteria of the organizational structure was division into four main categories that

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would classify human history: Action, Orientation, Word, and Image. We can decode these ideas through Warburg's "law of good neighbour," which essentially subverts classification by subject. In the words of Fritz Saxl, Warburg's librarian:

> The book of which one knew was in most cases not the book which one needed. The unknown neighbour on the shelf contained the vital information, although from its title one might not have guessed this. The overriding idea was that the books together—each containing its larger or smaller bit of information and being supplemented by its neighbours—should by their titles guide the student to perceive the essential forces of the human mind and its history. Books were for Warburg more than instruments of research. Assembled and grouped, they expressed the thought of mankind in its constant and in its changing aspects.[51]

This is a personal narrative about the connections between titles, but it is also an attempt to develop a different strategy for associated publications. Warburg then tried to define his library as a "Problem Bibliothek" ("question library"), which should support the visitor's experience of the library space and the relationships between publications from this perspective.[52] The validity of this experiment has been confirmed over the years as the Warburg Library has become an institution that has been taken over by the University of London and its collection has grown to more than 350,000 books.

Warburg's legacy can be illustrated by several examples: the Prelinger Library, founded in San Francisco in 2004, is one of the most famous independent libraries with a similar freedom of cataloging.[53] It houses a remarkable collection of fifty thousand image-rich historical ephemera, periodicals, maps, and books from the nineteenth and twentieth centuries, mainly donated to be available to the local community of artists, writers, and activists and to remain independent of the institutional library system. The founders (Megan and Rick Prelinger) have developed a classification concept for a similar organization based on associations and unofficial definitions of categories. The Reanimation Library also has a graphics-oriented system. It is an independent library based in Brooklyn that keeps books, typically discarded by other libraries or sold cheaply at thrift shops or flea markets around the country, that contain interesting

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graphic material that can inspire readers.[54] Founded in 2006 by Andrew Beccone, it is based on a curatorial taste that goes beyond the book as a cultural entity. What is preserved in this library is the iconography of publications, found with the same spirit of the *objet trouvé* through a careful search among the remains of twentieth-century production. What finally emerges is a revamped discarded value of these publications. Both the Prelingers and Beccone encourage visitors to digitize the content of the publications by providing technical facilities.

If we juxtapose Warburg's personal and relatively new way of cataloging (question-oriented) with the Prelingers' (heterogeneous) and Beccone's (graphical), we could ideally develop a new approach based on the freedom of cataloging that reconfigures the locus of knowledge into a series of topologies. This would make it possible to use different topologies to track unmapped cultural connections, expanding and possibly reprogramming the hidden network of connections that artists often represent in their work. It would then become reasonable to use libraries as a subjectively curated space.

These examples are clearly an extended expression of their founders' visions of a different kind of library that is still open to the public. But there are also independent libraries developed by and restricted to specific users who want a different kind of access. Among the private libraries that wanted to share their services with a specific audience was Benjamin Franklin, who in 1731, together with a group of friends, founded the Library Company of Philadelphia, the first American subscription library aimed at a specific and select clientele. The individual members did not have sufficient funds to start a library themselves, but they recognized that "the contribution of each created the book capital of all."[55] It was a membership library that allowed members to borrow books, and it can be considered one of the forerunners of contemporary DIY libraries. Like Franklin's library, DIY libraries tend to serve small or more specific communities and have been established with a variety of different approaches. Their social impact goes beyond citizen libraries or bookshelves spontaneously set up in public spaces that allow for basic free book exchange, such as the privatized BookCrossing scheme,[56] or the open source Little Free Library,[57] which is based on publications that are dropped off or picked up in public. Structured independent libraries

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encourage small communities to organize, build, collect, and manage a focused collection and from there give space and time to a shared interest in specific cultural areas, with the opportunity to learn and deepen. These initiatives usually create a space to which the founding community feels a sense of belonging and therefore function as an extension of their familiar spaces. In this sense, community libraries are not a representation of the community itself but an extension of the community, a common ground to facilitate the development, and flourishing, of the community.

The contemporary version of private DIY libraries is instead based on a concentrated collection provided by a few bibliophiles in a private, communally rented, and usually technically equipped space through a monthly membership fee. Wendy's Subway in Bushwick, Brooklyn, is a classic example.[58] Dedicated to poetry, art, theory, and philosophy, it also contains the Laurin Raiken Archive, an extensive resource for the study of art history and criticism. The books are donated by the founders or from collections donated by bibliophiles. They are not circulating, so they can only be read within the library, but one of the main concepts embodied here explores "the social life of the book."[59] This type of space benefits from the limited number of people and the small environment they manage, but they also include lectures and different types of communal-based activities in their program. Maru Calva, founder of the similar Biblioteca Aeromoto in Mexico City,[60] says: "We dream about [. . .] always having someone researching or giving a lecture or learning something."[61] Creating a social space for self-organized education is part of the common mission of libraries, but this is especially true for the do-it-yourself scheme where minimal resources are balanced by mutual support among members who share a passion for the relevant topics.

Each library serves a community, but community libraries are designed to directly support their respective communities through specific library configurations. A pertinent case is the Art Division in Los Angeles, founded by Dan McCleary initially with his mother's art book collection and then strengthened by various donations.[62] With eight thousand titles, it is dedicated to educating people between the ages of 18 and 26 in the arts through a free master's program based on the collection's publications. It is open for people to attend classes and also functions as a classical library, making an important contribution to the educational program.

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Many DIY libraries in non-Western countries, like Aleph B in Beirut, target local communities of artists and students.[63] For example, they make available hard-to-find texts on art and design and sometimes offer digitization programs.

These libraries redefine some essential components of the library ecosystem: classification, content, access, and organization. They position themselves outside institutional networks as alternative models. However, this leads to a series of case studies, a small galaxy of independent libraries, that build a different and disjointed cultural topology. Most of these libraries are building alternative collections, which can be evaluated as purely artistic, or activist, gestures but also as experiments in realizing a different library ecology for a small target audience. We can see them as *an extension of classic libraries*, which they may complement. In this respect, it is possible to envision a future shared infrastructure that flexibly integrates these efforts with networked institutional library catalogs and dramatically expands access to needed information, and possibly resources, at the public level. This would also foster a mutual influence between the codified institutional environments and the free-floating alternative environments, reshaping their forms to better reflect contemporaneity.

Distributed Libraries

The idea of a joint effort to unite different types of libraries to create records and collections of specific publications is not a new concept. In 1541, Conrad Gessner, a Swiss scholar, began compiling an extensive work he called the *Bibliotheca universalis*.[64] His aim was to compile an exhaustive catalog of all Latin, Greek, and Hebrew works known up to that time by all writers who had ever lived. Gessner is now considered the father of bibliography. His efforts ended in 1549 with a list of three thousand writers and twelve thousand titles. Gessner's original goal of comprehensively recording the output of published works of his time reflects a very human quest for completeness but also a need and curiosity to know more and thus explore new intellectual territories and references, even among those more familiar to us. This issue is particularly sensitive for underrepresented cultures that have survived on the margins of the large publishing ecologies that have also supplied the bulk of institutional libraries over the years. These cultures would be given the presence they

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deserve in libraries through their respective publications, which could be compiled with the same curiosity and methodological understanding of cataloging as Gessner's to map and connect the small collections that exist. In this respect, a methodology that at least uses the digital to share the bibliographic data and the network to physically locate the various publications would make a difference in preserving and facilitating the emergence of different marginalized cultural scenes.

The idea of a "distributed archive" originally arose during a working group at the Archive 2020 conference in Amsterdam, which I attended, and which looked at how archives managed by noninstitutional bodies could be created.[65] The discussion was based on the idea that in any literary, artistic, or musical subculture there are usually a small number of easily identifiable individuals (journalists, historians, collectors, obsessive fans) or small institutions who have spent years amassing relevant collections of publications, which are often forgotten when these efforts cease or their activities need to be refocused.

Without knowing it, a similar concept was already developed in San Francisco from 2003 to 2007. It was called the Distributed Library Project and involved around nine hundred users registering more than six thousand books, but it never worked because no one asked to borrow the books.[66]

The concept of the *distributed library* is thus based on the fact that these collections of publications form a very specialized library, scattered in multiple spaces and managed by multiple subjects—in other words, *distributed*. Moreover, in most cases, the content of these libraries is not included in the catalogs of institutional libraries.

The distributed library can be formulated as follows: it should support the online publication of catalogs of private, small institutions' library collections and make them publicly available as a shared resource. Other possible steps include: a vertical search engine that searches a contiguous group of libraries all dealing with compatible topics, the inclusion of corresponding digital files after gaining explicit permission by authors and publishers, a dynamic digital visualization of the corresponding content that individualizes certain categories through metadata or keywords.

The role of a distributed library is to collect and share, not necessarily to take a deterministic approach. This is particularly important in relation to the type of material they should consist of. For example, there are

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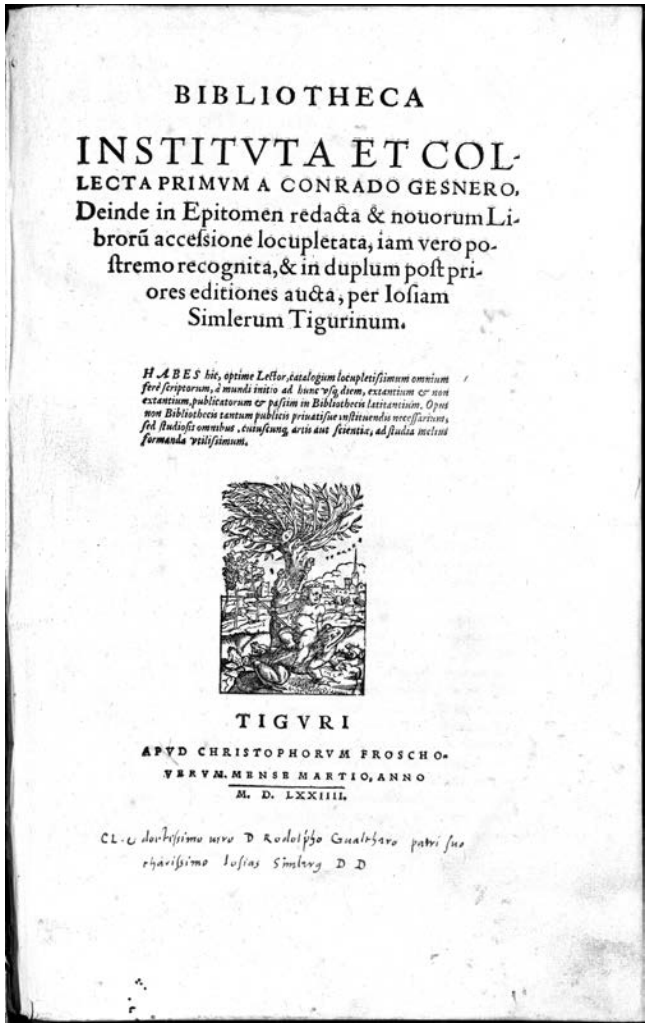

BIBLIOTHECA

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LECTA PRIMVM A CONRADO GESNERO,
Deinde in Epitomen redacta & nouorum Li-
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ſtremo recognita, & in duplum poſt pri-
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FIGURE 5.6
Conrad Gessner, *Bibliotheca universalis*, title page, 1574.

publications that are printed in strictly limited editions that are meant to become rare after a few years and that are rarely found in these libraries, but perhaps a copy will be donated to them at some point. If distributed libraries were able to attract such valuable donations, their preservation role would be even more openly recognized. It is also important to stress that publishing the relevant data online means taking responsibility for

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such collections, which implies a "definitive accumulation," a preservation of the memory of a particular field and thus of its partial but documented history.[67]

As part of the activities of *Neural* magazine, we have developed a web platform called Neural Archive to facilitate and illustrate this process.[68] It is a database developed with free software, the most basic standards from IT, and publicly available code. The software platform makes it possible to index any collection of publications by entering the bibliographic data and scans of the publications' covers. This platform displays the archive of media art publications that *Neural* magazine has accumulated since 1993, mainly through donations. The aim is to further index the archive while establishing collaboration with other online catalogs of small libraries concentrating on media art focused libraries and to encourage the use of the infrastructure, or the development of similar infrastructures, by other cultural institutions.

A tool that can search all the catalogs should lead to a jointly produced bibliography that is extremely specialized and based on the physical books held on the participants' respective premises. Although probably none of the small units would be able to provide concrete public access to the respective physical collections, this process would ensure proper indexing and preservation of the specialized subjects. Once the catalog is published, one of the biggest challenges would be to structure the data in such a way that it is compatible with current library standards and forms an independent conceptual missing side of the library system that is perfectly searchable and compatible. Distributed libraries can grow even more, and faster, than classical libraries because they are not tied to a single location and can be dynamically reconfigured.

The preservation of knowledge under these conditions presupposes new values arising from social needs and self-organizing networked structures, so that the distribution of knowledge itself becomes a strategy rather than a limit. While Friedrich Kittler outlined the remarkable difference between "transmission" and "storage" in the media and their respective values,[69] in a distributed library system the "transmission" achieved by the networked infrastructure becomes fully functional for the storage needed to preserve the physical copies in such a way that they need each other and do not compete. This type of sharing is needed in

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FIGURE 5.7
Neural Archive entry page, 2022.

contemporary archives: they need to transmit their presence and to be recognized by the networked world out there.

Moreover, the distributed library is a *polycentric system* that ensures that "all parties are involved with some control over the outcomes."[70] In fact, the control over the outcomes is both shared and the sum of the respective collections, which depends on each one being an irreplaceable

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part in its local specialization. Each node in this system counts and contributes to the system itself, regardless of its size.

This creates a collective, crowdsourced bibliography that is also a tool for scholars and librarians. Moreover, these bibliographies, and especially the real collections behind them, are an expression of the physical presence of published materials that are largely uncataloged in traditional libraries and thus represent a kind of "other half" of libraries. They represent the highly specialized part of the fringe cultures that have so far been marginalized by traditional libraries due to a lack of resources, including physical space.

In this respect, the custodian concept perfectly articulates this vision of using and connecting the available structural possibilities for a collective preservation strategy. The concept states that a library can also be a social fabric that overlays and builds up a cultural texture that can potentially extend to any place of preservation. This is particularly important given the potential new dual role of institutional libraries as public custodians and facilitators of private custodians, creating a distributed and scalable model of interconnected collections, with the underlying tension of an all-encompassing universal library that remains a utopia even in the infinite dimension of the digital.

Temporary Libraries

The temporary library is a form of social practice that lays the foundation for a new form of librarianship that bridges the institutional and the independent. The concept of the temporary library is based on social and political mechanisms: the aim is to create both a stable and movable cultural resource of media art from a series of negotiations, relationships, and public actions.

Moving a library beyond its institutional walls has been attempted a few times in the past. Alberto Manguel stated that "every library is migratory,"[71] which he elaborates through historical examples of small libraries travelling with famous warlords such as Alexander the Great, or Napoleon who took a wooden box full of history books to almost every country during his campaigns.[72] More concerted efforts of migratory libraries can be found to stem from the end of the nineteenth century, when collections of books were carried by means of evolving transportation, from carts to

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FIGURE 5.8
Three of the bookmobile staff, circa 1930. Cincinnati and Hamilton County Public Library. From the collection of Cincinnati and Hamilton County Public Library.

cars and vans, and which, since the mid-twentieth century, have been synonymous with the term "bookmobiles," or mobile libraries.[73] Their structure is simple: a modified vehicle is filled with shelves and publications, which are available to borrow in the place where it is temporarily parked, like a more formal public library. The bookmobile breaks classic library boundaries, metaphorically represented by the library walls, bringing publications to new places and expanding and redefining the public role of libraries in a more contemporary sense.

The physical moving of structured and organized content has also been experimented with in the mail art practice of "decentralised congresses,"[74] started in 1986 and consisting of spontaneous and self-organized events, such as the "Move Your Archives" initiative. Launched in 2016, this initiative incited the owners of mail art collections to meet physically, to show mail art archives to each other, or to display them at publicly accessible events. In the spirit of mail art, the materials, including underground publications, have been in transit and have been exhibited with a do-it-yourself attitude. In the press release written by mail art historian Vittore Baroni, he states: "these heritages of ideas are liable to remain submerged and ignored, continuing to gather dust on shelves or to languish in boxes locked in garages and attics."[75]

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Moving printed matter to where it is needed is a social exercise to create nomadic spaces for the free circulation of printed culture. And, despite the global accessibility of some, or most, of its material through online files, the creation of a physical space is richer than a mere download. If moving entire libraries or big archives cannot be considered as a practical solution, moving curated parts of them where they are more needed is a gesture that can activate relevant spaces of culture. The selection of media allows for a focusing of a specific interest, defining a physical space of reference that opens opportunities of social interaction. As such, physical publications can become the prompt for a conversation among people sharing the same interest in a topic, leading to possible collaborations and exchanges of information and/or ideas. Importantly, exposing a specific group of people to a library of materials can foster the awareness of its existence, intrinsically preserving its memory and stimulating the connections between the different elements—between publications and their public. These practices then trigger a virtuous circle of awareness and curiosity through exposure, availability, and shared physical space. Overall, these critical considerations of the library, its movement, and its openness underpin the specific aims of this project to foster and care for the history of ideas around media art through the physical mobilization of publications. The project also hints at the fragility of media art embedded in its format, relying on the used media, which are deteriorating over the years, or becoming incompatible with contemporary machines. One of the crucial aspects of preservation is then to support its most stable aspect: printed documentation.

Liminal Librarianship

There is an invisible publishing ecology that is completely outside the mechanisms of the market that includes the forgotten or discarded titles that lie passively hidden somewhere or are thrown straight into the bin. The large number of books that are thrown away every day, even when they are still in good condition, represents entire potential libraries that could be a free social resource. A few exemplary cases show how this practice can achieve unexpected results. A few garbage collectors in Ankara, Turkey, have started collecting discarded books, which they have collected in a library for themselves and their families. It has grown to twenty-five thousand titles and has started receiving donations to start in situ

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consultations and lending services for schools and prisons.[76] Similarly, José Alberto Gutiérrez, a rubbish collector in Bogotá, Colombia, has accumulated about fifty thousand books in his twenty years of service and has started a community library called La Fuerza de las Palabras (The Power of Words), which also donates reading materials to several hundred schools and communities.[77]

These libraries have arisen from the remains of the consumption of publications. The people who collect these rejected publications realize what I would call *liminal librarianship* by salvaging what has been suffocated in the consumption cycle and then transforming it into a free and stable public resource. It is particularly important that there is no money or personal interest involved in this process but a strong sense of belonging to their society and the intention to serve it, in a virtuous circle.

Theory and Practice of Temporary Libraries

Liminal librarianship might also focus on curated selections that can be moved where they are needed. The curation and mobility of these selections can be formulated as a librarianship methodology.

My formulation of a "temporary library" is based on social and political mechanisms: the aim is to create both a stable and movable cultural resource of media art from a series of negotiations, relationships, and public acts. Since 2014, the developing approach has been based on the dynamics of knowledge exchange. It operates by questioning the modalities of cognitive transfer through the exposure to, and archival of, selected publications. It creates a specific cultural environment whose starting point is to remind the public that the library is already an open access system, one that can be enhanced, creating new library forms. The project's purpose is to create a sense of giving to a community, it speaks to the library model through contributions and subsequent sharing. This approach is socially oriented; the main concern is to elaborate on a model for devising and sharing specific libraries, each fruitfully adapted to different cultural backgrounds. The research process starts by defining a subcategory of media art, then invites an expert to cocurate a list of publications that better represent such a category. Then, publishers, institutions, and artists are asked to donate a single copy of each required

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Figure 5.9
A garbage collector browses the shelf of their library in Ankara, Turkey, 2018. Courtesy of Çankaya Belediyesi.

publication, and the resulting library is freely available for consultation during a related event, such as a conference or a festival. The social space that is created with the library facilitates the discovery and acknowledgment of those who produced and/or shared the publications, but it is also a community exchange among those who are consulting them. The exhibition of the selection within a contextualized setting helps connect with a pertinent audience and is of specific interest due to the intrinsic value in the consistent retrieval of noteworthy and often rare titles. Finally, the library is donated to an institutional library, often of a university, with the agreement that it will be cataloged as a special collection. This creates a stable resource, with no funding involved, that can be lent on request to another event in the future. This collective effort resonates with others who use caring and sharing to preserve media art. The future management of the collection is handed to the respective librarian, to further reinforce its openness and public nature.

Furthermore, a temporary library also activates, through donations, certain types of publications, such as small art catalogs, which are often

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produced and then abandoned or await some interest from the producing institution. I refer to these types of publications as *sleeping knowledge*, just like many other types of publications that are not sufficiently highlighted to attract the attention of the interested community. This activation is achieved by the circulation of the publication in that community, and it even works just by knowing these works exist. They metaphorically break down the monumental character of the library and its physical centrality and are meant to give space to external, qualified interventions, while ultimately being integrated into the systems.

I have personally codeveloped a few temporary libraries. The Temporary Library for Transmediale was developed in conjunction with the homonymous festival's thirtieth anniversary edition in Berlin. Cocurated with Annette Gilbert, it focused on the untracked history of the festival itself, including various offspring that have continued to independently enrich the media art scene in Berlin. The library, which formed a spontaneously crowded social space during the festival, was subsequently donated to the local Universität der Künste library.

FIGURE 5.10
The Temporary Library for Transmediale, 2017. Photo: Adam Berry, CC BY-SA 4.0.

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The Temporary Library of Latin American Media Art was cocurated with Andrés Burbano during the 2017 International Symposium on Electronic Art in Manizales, Colombia, surveying the media art production from this group of countries, mainly Peru, Chile, Uruguay, Argentina, Colombia, Brazil, and Mexico, which has been largely overlooked in the West. The library generated enthusiasm among the donors, curators, and owners of the small institutions involved, who suggested and provided obscure titles and actively and generously contributed to its construction and transportation. Those involved recognized each other's historical efforts and sometimes met for the first time, as travelling across such a vast territory was always expensive. The library was then donated to the local library of the Universidad de Caldas.

The Temporary Library of Portuguese Media Art was cocurated with Luísa Ribas and Miguel Carvalhais for the xCoAx 2017 conference in Lisbon and focused specifically on historical Portuguese media art production. It drew together various small publications and catalogs, expressing Portugal's attitude toward performative art and sound art as traced

Figure 5.11
The Temporary Library of Portuguese Media Art during xCoAx conference, Lisbon, 2017. Photo: Matilde Albuquerque.

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through a small history of festivals and events. Some innovative reconfigurable shelves were conceived during student seminars, and the same students also programmed a generative computer script to print out the catalog always in a different order. The library was then donated to the local Universidade de Lisboa library. This library was the first to be temporarily moved to another location. Thus, the original overarching concept of the Temporary Libraries project was fully realized. In this case, the library was included in the Bienal de Arte Contemporânea da Maia 2019 and was on display there as an installation for more than a month. Afterward, it returned to the Ulisboa Library.[78]

The Temporary Library of Norwegian Media Art was cocurated with Zane Cerpina and Stahl Stenslie for the fifth Trondheim International Biennial for Art and Technology—Meta.Morf, 2018.[79] The library was donated to the Trondheim Electronic Arts Centre (TEKS), which now preserves and develops it. This library also moved for its "second edition" to be part of the international conference exhibition *Female Artistic Experiments Norway* (*FAEN*) in 2019. It was exhibited for ten days, and forty new titles were added through another selection before it was brought back to TEKS.

The Temporary Library for Creating Commons was cocurated with Felix Stalder, Cornelia Sollfrank, and Shusha Niederberger and was part of the *Creating Commons* exhibition at the Panke Gallery in Berlin in 2019, donated afterwards to the library of the Zurich University of the Arts.

The Temporary Library for Danish Media Art was cocurated with Morten Søndergaard and Mogens Jacobsen and was part of the Aalborg MicroPOM in 2022, donated to the library of the Aalborg University.

The temporary library is a practice of institutional critique of its limitations in representing significant but less popular cultural phenomena. It is achieved through an ambiguous manifestation that is partly an activist strategic practice, partly an artistic performance and intervention, but which in its final embodiment creates a common shared territory between the institutions and the communities of reference.

It also automatically creates the most comprehensive crowdsourced bibliography possible on specific topics. Avoiding any ambition of *completism*, which is instead a founding principle for specialized libraries, the temporary libraries are meant to be new epicenters for libraries to historicize underrepresented cultures. Once donated to an institutional

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library, they are not meant to be preserved as such, but to thrive. Further curation, which consists of adding new titles to the special collection, is simply passed on from the curators to the subject librarians.

Finally, the voluntary effort is a form of "techno-volunteerism," or the organized collaboration that can occur within specific support networks, and is absolutely essential in this configuration.[80] The different actors, the curators, the event organizers, and the librarians, volunteer some of their expertise to create a professional resource from scratch. In this way, as defined by Matthew G. Kirschenbaum, we realize "effective preservation, [which] must rest in large measure on the cultivation of new social practices to attend our new media."[81]

Librarians as Shamans

The role of the citizen librarian, which is also the role of the activist librarian and the artist librarian, should be to engage with the different types of library structures, from the institutional to the alternative and purely digital, and to create bridges between them and spaces of exchange between readers. They should perform both tasks, being a custodian, preserving, sharing, and guiding when needed. Ideally, these practices should unlock possibilities that already lie within the space of a publication's content. These networked libraries, with their structure and content, would host and suggest, share, and hint at a cultural potential that is just waiting to be liberated. They would be "the hushed library [. . .] with its titles aligned [. . .] to form a tight enclosure, but within confines that also liberate impossible worlds."[82]

This potential of liberation has been conceived and put into practice by a variety of approaches. Arthur Koestler suggested a parapsychological methodology. He tried to explain the random but meaningful associations that can be found between books as "the library angel," where information becomes accessible through serendipity, coincidence, or providence, reminiscent of the practice of collecting rare finds in libraries.[83] But there is also the metapublication approach, as in the *Library Excavations* series, which highlights materials found in public libraries.[84]

Both the librarian and the custodian would then be elevated to *shamans of knowledge*, knowing their collections in such a way that they can

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guide others to discover new connections and create new social and cultural relationships. The shamans have exceptional qualities, they help others with their knowledge and mediation between the known (material) and the unknown (immaterial), and they are able to navigate the complexity of forces and relationships. They should be of inspiration for librarians at all levels for their role. Librarians should be as shamans in the sense that they could help construct and discover paths to reclaim cultural space and history through deliberate actions, gestures, and interventions. They should compile specialized bibliographies, build specialized libraries, and yet influence and instigate the evolution of institutional libraries.

The mission of librarians is to improve society by facilitating the creation of knowledge in their communities.[85] Physical libraries are the outpost of the social sharing of knowledge, while digital libraries create greater access but not necessarily communities. It is possibly the combination of the two, with conceptual and operational bridges at different levels, that can have the greatest social and cultural impact. Curated selections in distributed and temporary libraries should allow interested readers to familiarize themselves with titles that are continually recurated, to develop and to challenge perceptions and understandings of a particular cultural field. Furthermore, curated libraries in public spaces allow for the creation of a space of dialogue and interest. These would function as both temporary and social installations, creating afterward some forms of stable cultural resources. The coming together and possible networking of the various physical and digital library forms through the sharing of their data does not serve the unnecessary goal of a universal library but quite the opposite. It should serve the goal of creating multiple interconnected layers of horizontal access to specialized culture, where content both creates spaces of elaboration and becomes tools to produce new social actions in a positive form of cultural guerrillaism. These spaces, populated by a variety of shamans of knowledge, would instigate institutional change and create cultural values outside and inside the institution.

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6

How We Should Publish in the Twenty-First Century

We Are in a New Ecology of Publishing

We are part of a new ecology of publishing that is constantly evolving, changing the possibilities of traditional publishing, and fostering the constant reshaping of the digital world. Publishing today is a structured gesture. Around the old-fashioned triad of editing/composing/releasing, there is a new galaxy of processes involved before the publishing gesture becomes a product. Editing means, more than ever, filtering, selecting, and limiting. The vast amount of readily available sources combined with the perennial online updating completely restructures this paradigm. The role of the editor is to filter the myriad of sources, to preserve their heterogeneity, to discover, select, and include new sources, but to keep their final number limited, and to confirm them, transparently acknowledged, in order to strengthen trusted networks.

Composing today means producing valuable content in a scenario consisting of dynamic and fluid publishing environments. It is dictated not only by technologies but also by temporal, conceptual, and technical standards and access to interconnected communities of potentially interested readers. It is about a subtle balance between publishing and access, or between a product and a service.

Publishing is about delivering content in the chosen mix of forms through the combination of chosen channels. It is no longer a pure one-to-many distribution process but a combined strategy of distribution, dissemination, and announcement. And it can no longer be one-way but must involve and nurture a liquid community that supports the end result of the publishing process.

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Publishing, then, is in the highest degree a meaningful gesture that serves to *publish* what is *unpublished*, meaning not yet public, for a specific audience, which can always be extended to parts of it that are as yet unknown, with the specific aim of making a difference to what has already been published. The nature of publishing is thus very different from that of spreading or popularizing.

This scenario is made more pronounced by the intertwining of possible other technologies, media, and social strategies. Part of this can be seen as an antidote that can lead to a counter-remediation of content by *dedigitizing* digital content for the material world, as discussed in chapter 4.

This process, combined with responsible editorial practices, constitutes the modern authoritativeness of publishing. It is articulated through the establishment of external dialogues with external entities, including social media, through mutual learning and the exchange of content, ideas, and formats through modalities close to the tradition of oral culture or word of mouth. But the original oral culture depended on physical presence to gain trust. Without physical presence when reading a text from an unknown source, can we still tell if it is from a person manipulated by post-truth or from a properly programmed bot? The fragility of the information on the screen is compensated for by the spatial presence of the published product or the author exposing himself in a digital public context.

Responsible editors should create an *object-oriented publishing* system that privileges the relationship with the audience, through solid formats, in a dialogue between trusted sources and implicit endorsements.

This could create an *economy of acknowledgment*, where mutual trust allows new ideas to connect with undiscovered connections in the trusted history cultivated in the scholarly dimension of archives and libraries.

The Ecology of Space and Time

Publishing always involves a specific use of space and time, and their strategic use is essential to create a framework for content. We should let our senses to be involved, choosing the space and time we want, let them play their role in communication, consider the specificities of the media, and not be afraid to hybridize them.

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Even though publishing today means dealing with multiple production modalities, formats, and channels, the point is to formulate a consistent methodology to coherently merge form and content and to mirror in them the efforts of the editing process.

The challenge is also to constantly evolve this process to meet the rapidly evolving forms of publishing. Having amply demonstrated that one mass medium cannot replace another, as evidenced by the unthreatened presence and role of radio, television, and print media in the current postdigital era, it is important to understand how they influence and transform each other.

The integration of different media into a publishing ecology mutually conditions space and time. In 1924, the *Chicago Daily News* published several "Radio Photologues" in its weekend edition: a series of contextualized images that enriched and historically classified the program broadcast by WMAQ, the newspaper's radio station, on the same day.[1] This synergy extended the space of print beyond its visual material on the page, and the print itself became an asynchronous contextualization for a broadcast sound. The asynchrony of print media has evolved dramatically in comparison to how other media has evolved online and digitally. It has become a distinguishing feature that changes the economics of the medium and assigns it a different, more sophisticated and erudite role. In the experimental series of paperbacks by Marshall McLuhan, Jerome Agel, and Quentin Fiore in the 1960s, the creators embodied the TV synthetic information aesthetic and language in the universal paperback format, accumulating concepts in a visually explicit form so that they could be defined as "inventory paperbacks."[2] Here, the characteristic immediacy of television is frozen on the double pages, possibly at its most revealing moment, and the ephemeral content is captured in the space of the pages.

These examples are from a different time, but if we compare them with contemporary schemes of integrating images, video, and audio examples in online journal articles, we can justifiably claim that once the different media are encoded in the same digital form, they change their status, becoming editable and combinable at all levels. In the postdigital world, all media have been reduced to a binary form but retain their format and grammar. The digital form in particular has conditioned the other media like an *agent of change*. The older media take a while to adapt and change,

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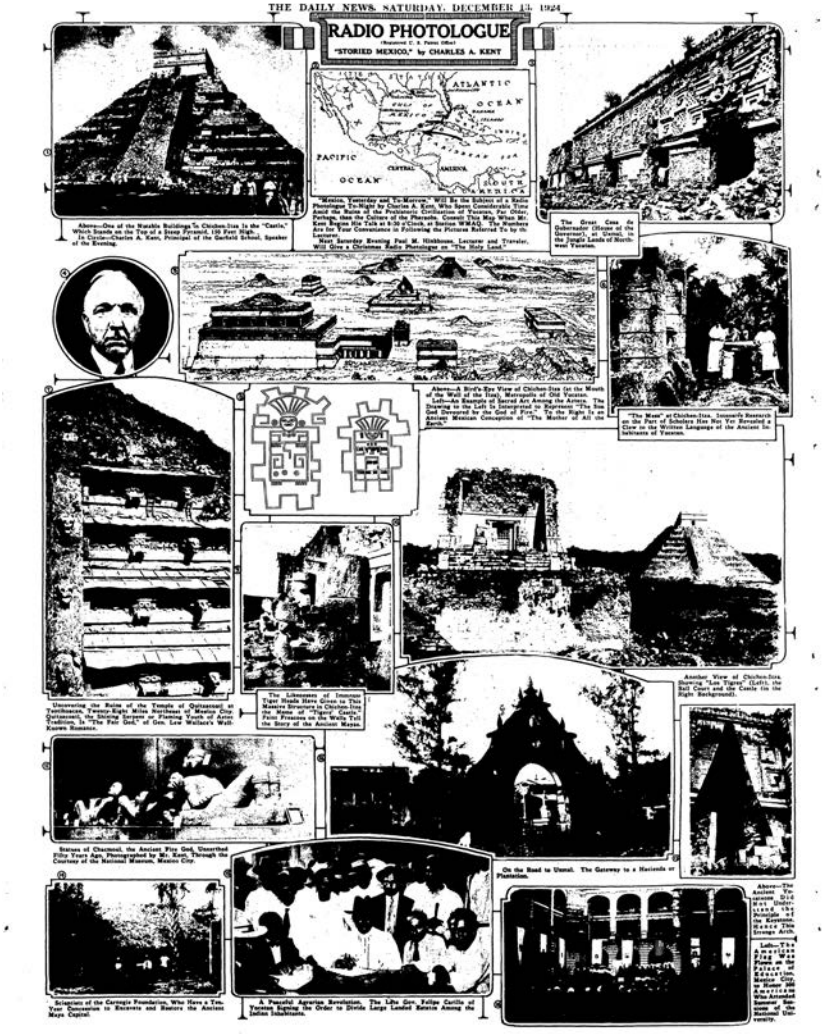
THE DAILY NEWS, SATURDAY, DECEMBER 13, 1924

RADIO PHOTOLOGUE

"STORIED MEXICO," by CHARLES A. KENT

ATLANTIC OCEAN

PACIFIC OCEAN

CENTRAL AMERICA

SOUTH AMERICA

"Mexico, Yesterday and To-Morrow," Will Be the Subject of a Radio Photologue To-Night by Charles A. Kent, Who Spent Considerable Time Amid the Scenes of the Prehistoric Civilization of Yucatan, Far Older, Perhaps, than the Cultures of the Pharaohs. Consequently This Map When Mr. Kent Tells Of the Travels He Made While There. Will Be Used in This Area for Your Convenience in Following the Pictures Referred To by the Lecturer.

Next Saturday Evening Paul M. Hitchhouse, Lecturer and Traveler, Will Give a Christmas Radio Photologue on "The Holy Land."

Above—One of the Notable Buildings in Chichen-Itza is the "Castle," Which Stands on the Top of a Steep Pyramid, 100 Feet High. . . . by Charles A. Kent, Principal of the Garfield School, Speaker of the Evening.

The Great Casa de Gobernador (House of the Governor), at Uxmal, in the Jungle Lands of Northwest Yucatan.

Above—A Bird's Eye View of Chichen-Itza (at the Mouth of the Well of the Itza), Metropolis of Old Yucatan. Left—An Example of Sacred Art Among the Aztecs. The Symbol on the Left Is Considered to Represent "Tlaloc," the God Believed to Be Identical with the Jehovah of the Ancient Mexican Conception of "The Mother of All the Earth."

"The Maze" at Chichen-Itza, Scene of Research on the Part of Scholars Has Not Yet Revealed a Clew to the Written Language of the Ancient Inhabitants of Yucatan.

Another View of Chichen-Itza, Showing "Los Tigres" (Left), the Ball Court and the Castle (to the Right Background).

Uncovering the Ruins of the Temple of Quetzacoatl at Teotihuacan, Twenty-Eight Miles Northeast of Mexico City. Quetzacoatl, the Shining Serpent or Flaming Youth of Aztec Tradition, Is "The Fair God," of Gen. Lew Wallace's Well-Known Romance.

The Likenesses of Immense Human Heads Have Given to This Mysterious Ruin Its Name, the Maze of "Tigres' Castle." Faint Traces on the Walls Tell the Story of the Ancient Mayas.

Statues of Chacmool, the Ancient Fire God, Unearthed Fifty Years Ago, Photographed by Mr. Kent, Through the Courtesy of the National Museum, Mexico City.

On the Road to Uxmal. The Gateway to a Hacienda or Plantation.

Scientists of the Carnegie Foundation, Who Have a Ten-Year Concession to Excavate and Restore the Ancient Maya Capital.

A Peaceful Agrarian Revolution. The Late Gov. Felipe Carrillo of Yucatan, Signing the Order to Divide Large Landed Estates Among the Indian Inhabitants.

FIGURE 6.1
"Radio Photologues" in the *Chicago Daily News*, December 13, 1924, p. 37. Courtesy of Harold Washington Library.

partly because we only notice the changes later. It is not easy to immediately recognize these changes; as McLuhan said: "Because of the invisibility of any environment during the period of its innovation, [. . .] an environment becomes fully visible only when it has been superseded by a new environment; thus, we are always one step behind in our view of the world."[3]

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This gives rise to a scenario of publishing ecologies that emerge in new forms and can be recontextualized from one form to another. A rather radical example was put into action during the dramatic Brexit debate in 2019, when the group Led By Donkeys reprinted controversial statements made by politicians on Twitter, reprinting them on a large scale in a layout similar to tweets online, and pasting them over billboards and using them as giant banners unfurled over people at demonstrations (see figure 0.1). They used the most direct form of communication used by politicians but moved it away from the screen and backward, allowing a reemergence of some controversial statements and calling to account a few ambiguous protagonists of public debate. This resurgence of ephemeral tweets has been very successful in terms of popularity, as it has caused the reconsideration of certain quotes in a very recognizable visual form but rethought and relocated in a medium that is not highly temporary like the screen itself.

This contemporary condition, especially for texts rendered in different media, has been called "differential texts," or "texts that exist in different material forms, with no single version being the definitive one."[4] This kind of "versioning" of texts, and by extension other media, should compel publishers to think dynamically about how they might reshape content and condition their established modes of publication without necessarily reinventing them.

The role of print in this fluid scenario of changing forms is reinforced by its own characteristics. In the ephemeral nature of the screen, where content disappears and is easily forgotten, and in the alternation of formats and platforms, print is there only to be ready and possibly stored in an easy-to-find place for future use. The endless stream of information is edited out, and the rest sits on pages endlessly waiting for the reader. We should also remember that, beyond what we know, there is a galaxy of information that has not been digitized or that is not easily accessible but that could be related to what we know.

Moreover, the linear structure of printed publications seems to have become a value that leads to a less distracting and soothing reading experience. In a way, this seems to be related to the equally soothing sequentiality of resurgent vinyl and cassettes in music, which somehow freezes the tempo of the endless mix of tunes apart from their physical and tactile qualities that engage the senses.

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Print reclaims simplicity over the confusing complexity of too many options and control over the flow of information. It also reclaims the reliable archival qualities that freeze the endless flow of online information. As Ulises Carrión remarkably points out in his manifesto *The New Art of Making Books,* it is an "autonomous space-time sequence."[5]

This sequence structurally *reduces complexity* because it takes place in a conceptually limited space and time. The editing process fits into this limited space. The boundary drawn by the limitation of content supports the focusing and retention of long-term memory. Print thus becomes a luxurious publication with a slow information policy.

The Ecology of Machines

We should not publish because of the machines and even less just adopt the logic of the machines. Rather, we should publish with the machines and find our own personal formula with a few supporting tools to inspire and promote research and quality.

I would equate print in its contemporary role with analog photography. Neither is easily manipulated; they freeze time in a specific space with their content and are easily retrievable and archived. Technology mobilizes space and time, and machine systems embody the extension ad infinitum of this space-time sequence with AI-based techniques to automatically produce content at a faster pace than humans would be able to. This can be articulated in at least three different directions. The first is the digitization of everything, coupled with its inherent ability to be processed. Potentially, this leads to an infinite possibility of processes and computations that, beyond a certain threshold, can only be done by machines, requiring delegation of the process. The second is the dissemination of this calculated and computable information through networks, creating the perception of an even more infinite content space. And the third is to populate this space with automatically machine-produced realistic outputs, ranging from fakes to categorization of content through metadata, to feed further machine processing in a loop. The intangible scale of this process leads directly to delegating the machine to take care of the selection, qualification, and storage of content, putting at risk values such as diversification, quality, and effective retrievability of the same

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content in the context of *digital normalization*. This normalization can be the result of conceptually equivocating the digital as a medium. Technically, everything must be standardized to the binary encoding to use it, and then the processes must also be regularized in order to function. This character of universality then characterizes the results achieved through a machine logic of productivity rather than a humanistic approach.

In this complex scenario, machines play a crucial active role, not only infrastructurally by enabling instant publishing and digital dissemination but also in interpreting texts and refining their ability to write them. In this respect, their computations function in a way that is not exclusively aimed at supporting transparent processes but at accumulating qualified content in growing databases that can be used by algorithms.

In abstract terms, "scanners," which are conceptual devices for scanning and storing information, are used extensively to pass large amounts of data to algorithms, which in turn attempt to draw their own conclusions through machine learning processes. Limiting this scenario to texts, there is a cynical culture among all kinds of online publishers (individual and companies) that favors scanning bots as a reference for building and developing their own writing. On this premise, the writing is subjected to the systems that host it, to be read and acknowledged by the system itself, being deemed relevant in a dry systemic loop in the algorithmic selection of content we are exposed to through searches and timelines. This is what Ted Striphas once articulated in an interview when he acknowledged that "Culture now has two audiences: people and machines."[6] Machines seem to promote versions of our cultural productions that are computationally easier to interpret.[7] This becomes the default state once the digitization of everything has reached a dominant stage and our dependence on machines has reached an even higher status.

Jean Baudrillard and Jean-François Lyotard already foresaw this scenario in the 1980s. Baudrillard points out that "Digitality [. . .] is that which haunts all the messages, all the signs of our societies,"[8] while Lyotard adds, "the question of a hegemonic teleculture on a world scale is already posed."[9]

This altered nature of the text, once its matter has become digital, transforms it into unstable information. Its meaning can change according to its nature, its digital life can be called into question because of the nature of the system in which it is situated. Its substance is then a matter

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that floats between calculations that are never neutral because they are prompted or allowed by algorithms written by programmers.

In this new land of machine-populated readers, there are already small rebellions that oppose the omnipotence of machines in processing information once it has been digitized. These are sophisticated techniques of obfuscation in that they are the formulation of content that deceives the machine and whose processing proves useless, such as fonts that are unreadable by OCR,[10] plain text obfuscators,[11] and "social steganography,"[12] a technique used to hide messages in the titles of shared images or videos, or misspelled names that suggest alternative meanings. These efforts are reminiscent of some techniques used in novels to communicate without being noticed by a tyrannical authority or machine, as in the 1984 science fiction novel *Paradyzja* by Janusz A. Zajdel, in which people living in a totalitarian world use "Koalang," an Aesopian language full of metaphors that are impossible for computers to understand.[13]

Machine reading is still in its infancy and writes not only in the form of bot messages and constructed news but also in the weighting of systems based on metadata, which is essential for the description of the real and for the behaviors of algorithms.

Ultimately, the process of digitization or dematerialization, which abstracts content and makes it universally computable, affects machine logic. But what happens is that we move from one kind of matter to another.[14] The machines not only read the textual content, but they transform it, transduce its symbolic value, and integrate it into a living system. And in the end they change it into a potential "currency" for their intrinsic value.

We should use these systems, and the other industrial systems we already use, to inspire us. More than ever, we have the chance to discover. Discover from the digitized archives, discover from the present, through social media and its potential collective intelligence, and discover from the alien machine logic.

The Ecology of Distribution

The Gutenberg paradigm is over there are digital mirrors everywhere. Controlled reproduction of print has been replaced by billions of cameras

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and software that mirror content wherever people want to see it and potentially reembody it. The network can echo a publication with its own unpredictable space and time. But the role of the digital in the material space of information would be to transcend our physical boundaries and connect physical spaces, rather than continue to expand the endless digital spaces.

From two of my artist friends, I received a forged copy of my previous book, *Post-Digital Print*, that was photocopied and spiral bound. They found it by chance and bought it from a stand at an artist book fair in Mexico City. When asked, the owner replied that he liked the book but that it would have been too expensive to sell there if he had imported original copies and that his small economy had not hurt the book business. Actually, I consider this gesture a major acknowledgment. This is an example of how an invisible digital mirror mirrors a publication elsewhere, deciding autonomously on the form of materiality, the space and time of distribution, and introducing it into a local publishing ecology.

The space of a publication's physical distribution is still a value, mainly because of higher costs, lower support, and specific logistics. It cannot simply be replaced by digital distribution, because it allows for a physical exchange between author, publisher, and reader and takes place in a nondigital time, a slower time, conditioned and reinforced by the law of gravity, and in a nondigital space that is the same as the one we move in and very different from the alienated space our eyes follow on screens.

Being physically stable and mobilized implies a visible and perceptible presence that can potentially reach everyone in the right time and space, regardless of or with the complicity of a technological infrastructure. Distribution then creates a social space, because it needs a meeting place where the acquisition of the publication takes place, whether it is a moment of sale, a consultation, lending, a donation, or an exchange.

In the history of publishing, the early personal printers—first the mimeograph, and then the photocopier—realized a mobile and physically shared means of production. The physical contact made possible by handling publications as a gesture of recognition enabled an economy of trust overall. The space where publisher and reader meet is a place where both trust and the exchange of meanings take place.

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FIGURE 6.2
Paolo Cirio, *Daily Paywall*, 2014. Courtesy of the artist.

If publishing is first and foremost an act of mobilizing knowledge, then publishing that happens through affordable means and in a consensually shared space enables an even greater mobilization of knowledge. The resulting trusted human networks that work with published objects form a "performative materiality."[15]

There are radical experiments that can be performed in the juxtaposition of the different spaces of valuable online resources and physical dissemination. In Paolo Cirio's structured performance *Daily Paywall,* he stole sixty thousand paid articles from the websites of the *Wall Street Journal*, the *Financial Times*, and the *Economist*. Then he made them freely available on the website dailypaywall.com, which was offline after five days due to letters from some newspaper lawyers.[16] Next he got readers to focus on articles that would earn them a US dollar if they answered correctly on short tests about the same articles. He also printed one thousand copies of a newspaper with a selection of articles and made them freely available in special newspaper racks in New York City.

The project introduced challenging economics by stealing from publishing corporations and then economically rewarding targeted readers

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by radically rebalancing access to information while breaking down the paywall barriers. But it also enabled a process of socially oriented dissemination and feedback through the networks and print, breaking into the physical world through a formally forbidden reembodiment of information in a popular format and in a foreign place of distribution.

In both cases, the connection of physical spaces occurred through the digital mirrors that reembody the content in a different space and context without control by the original act of publication. The connection of all these spaces creates a distribution ecology that goes beyond the usual infrastructure of centralized production, distribution agents, and publicly accessible facilities. It enables a transfer of knowledge between entities, spaces, and matter. There are many possible combinations of such hybrid infrastructures that still aim to produce a publication and reach a desired audience.

On the other hand, publishers, librarians, custodians, and distributors have the potential to restore the centrality and, in some respects, the luxury of physical distribution and enable a mutual acknowledgment between them and their audiences that is only staged in the bulimia of social media likes.

The Ecology of Force Fields

Publishing potentially creates a metaphorical force field that arouses interest. It is a concept that Johanna Drucker has articulated in relation to reading: "Think of the page or screen as a force field, a set of tensions in relation, which assumes a form when intervened in through the productive act of reading."[17] But this tension, a cultural difference in potential, wants to be compensated.

This is because within the limited space there is a dynamic tension between the potential knowledge contained in the publication and the need or desire to acquire it. This tension is also present in the various polarizations and gaps within the content and between the publication itself and similar or related publications, with their undiscovered relationships, which is very present in libraries. But there is also a tension to the undiscovered meanings within a publication closer to Drucker's interpretation and to the possible serendipitous results supported, or not, by machine interpretations, including their possible errors.

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The publication, conceived as a "tissue of signs," is then a living entity that lies dormant until it is opened and read, when it is activated and its positive tensions unfolded as a whole in its manifested force field.[18]

In publishing, there is a general tension around truth, truth affirmation or revelation, which sometimes also prepares the field for post-truth dynamics. But there is also a tension between the players in publishing: the writers who provide the impetus, the publishers who give it form, context, and space, and the readers who make up their own sense.

The more these elements are connected and possibly interlinked, the more the sense is reinforced by trust, as each element needs the other in all directions. Publishing is no longer a unidirectional production chain as conventionally described. It does not go from conception to sale but all around, in a continuous *feedback* production through networks. If this feedback includes a care of the work, then it is strengthened in its whole process, possibly improved and stimulated into new works. We are dealing with ecologies of publishing based on *networks of feedback* that generate resonance and support and disseminate content in unpredictable ways.

Moreover, there are different times and spaces in these systems. The space may be a continuum between these supportive networks: the readers, the distributors, the friends/followers, the sympathetic colleagues, and so on. The bond between all these different elements is now established through this feedback system.

Time is structurally a relational and asynchronous time that reflects the feedback element. It is asynchronous through the digital feedback on the production expressed by all the actors involved on different platforms and media, from the contextualization of the shop in its promotional posts to the review of the critic in a printed magazine. And it is relational, as all the aforementioned actors are involved with the work at different moments. Then, the seemingly compelling attitude toward commenting and positioning that leads most social media activity, for example, can be part of this system and contribute to its economy by influencing producers and their relationship with readers.

The force field created by the activated publication generates further temporary force fields through the system of more or less spontaneous feedback.

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Toward a Heterotopia of Publishing

If everyone is a publisher, then everyone needs to be an editor. We should make our publishing world open but qualified by editing, and we should also make it finite and collectively use it. Understanding a publishing ecology means caring for audiences; nurturing diversity of sources, content, and media; and fostering inclusiveness, including that of machines.

Beyond the industrial online systems and mass market of publishing, there is a small galaxy of publishers, artists, and technologists who come together to form communities based on specific interests and practices through publishing. There is a close relationship between a publication and the community it speaks to. And a publication almost automatically defines a context in which the communities of interest live. But it is also that of a small galaxy of people who share the same interests, scattered somewhere else. So we can think about six degrees of separation between our "followers" and the whole audience of our publications. In all cases, a publication's potential community support may be infrastructural, for example, facilitating production, dissemination, presence, distribution, and preservation. Or it can be processual, helping to develop content through expertise and tools. Or it can create resonance by helping to make the existence of content known. This is why we should publish for our interdependent, supportive networks of people, and why we should preserve and share content relevant to those networks.

Using senses, machine-based processes and trusted and edited sources, it is possible to produce and share publications in a relevant and effective combination of time and space.

The printed medium is a device whose content can only be imagined when it is still unread, consequently creating endless versions, and which can be shared and expanded after it has been read. Yet it remains the same.

The digital medium is one whose dynamic ephemerality can spread so quickly that it potentially creates a supportive space with a mesh network of people.

The interconnectedness of publications, audiences, support, and preservation networks can form an impressive, trustworthy network of

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culture in constant evolution. By *reverse-engineering social media*, breaking through its industrial orthodoxy, and using it to discover and establish cultural relationships to be nurtured off of social media platforms, we can form the fabric for strengthening and expanding this inter-networking.

In this possible social scenario, this independent and inclusive publishing and archiving system can tactically form a solid and expanding heterotopia of publishing.

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Appendix: An Annotated List of 100 Experiments of Publishing for the Twenty-First Century

The following is an annotated ecology of one hundred diversely tactical and experimental publications of the twenty-first century, a conceptual periodic table to realize new experiments in publishing.

1. *American Psycho*

Mimi Cabell and Jason Huff
Traumawien, 2012
The entire text of Bret Easton Ellis's book of the same name was sent page by page between two Gmail accounts. The contextual ads, generated by Google through specific keywords arbitrarily isolated from the rest of the text, form the final text. These ads are printed as footnotes, erasing the original text by Easton Ellis. The book thus consists of blank pages with only the note numbers under which the keywords were printed in the original version and the corresponding ads/footnotes.
(deletionist, postdigital, processual)

2. *The Pirate Book* (*Neural* #53 intervention)

DISNOVATION.ORG (Nicolas Maigret and Maria Roszkowska)
2016
The Pirate Book documents media piracy practices in different parts of the world. The Aksioma institution produced a USB drive with the pdf file and original files they used for the book, including some that were quite controversial. Maigret and Roszkowska consulted a Paris law firm, which prepared a dossier on the contents of the USB drive and determined that it was legal overall. The USB drive was distributed to subscribers of the magazine, including institutional libraries, in a bag stapled to a page reproducing the dossier.
(documentative, piracy, legal)

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3. *No Patent Pending*

edited by Matteo Marangoni
MER Paper Kunsthalle, 2014
This is a book about radical approaches to media in performance presented as a series of loose pages in a box uniquely assembled by following a "procedural score" of permutations of the pages, composed by Lars Kynde and performed by iii group. Each book has a unique sequence of cards/pages. The reader is then faced with the challenge of either maintaining their own unique sequence or playing themselves by sorting the cards by page numbering to recreate the reading sequence.
(performative, procedural)

4. *eMotiVe sOuNDs of the eLEctRic wRiTEr*

Nandita Kumar
2013
The artist asked different people to write love letters addressed to various subjects. She then modified an old-fashioned vinyl cutter plotter and had it "print" the scanned and vectorized letters with a felt-tip pen. The machine stopped from time to time to work out the next part of the letter. This inadvertently created arbitrary dark marks on the paper, which were then used as an obscurely calculated musical score.
(machine-driven, emotional, glitch)

5. *The Girl Who Was Plugged In*

Felix Heibeck, Alexis Hope, Julie Legault
2013
A physically "expanded" book that uses different technologies (electric, robotic, sensory, digital) to amplify the action in the text with discrete feedback given to the reader through the connected devices attached to their body and colored light projected from the cover. It follows the narrated moods of the text, a science fiction novel by James Tiptree Jr. in which celebrities are subtly used by corporations to control consumers.
(robotic, emotional, atmospheric)

6. *The Death of the Authors 1941 edition*

Constant (An Mertens, Femke Snelting)
2013
See chapter 3.
(generative, copyright, plagiarized)

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7. *La carte ou le territoire*

Stéphanie Vilayphiou
2013
Vilayphiou chose a controversial book, Michel Houellebecq's *The Map and the Territory*, which had become known for its evident quotes from Wikipedia, which were never acknowledged by the author or the publisher. She wrote a software filter that parsed the text of the book in sentences (or parts of sentences) and searched the millions of digitized texts in Google Books to eventually find the same sequence of words in other books. The results are reproduced in the original writings, and the parts that match Houellebecq's book are highlighted in yellow. The book is completely transformed into a digital collage of quotations, whereby even the last ounce of originality is finally lost.
(copyright, plagiarized, postdigital)

8. *The Quick Brown*

Jonathan Puckey (Moniker)
2010
The Quick Brown is an effective experiment that allows you to track how online headlines on news websites change over time through the fine-tuning of the editor. Slight or radical adjustments are made depending on how the news itself and its full understanding evolve.
(unveiling, postdigital, reconstructive)

9. *Newstweek*

Julian Oliver and Danja Vasiliev
2011
See chapter 3.
(manipulative, fake, postdigital)

10. *install.exe/Jodi*

Tilman Baumgärtel
Christoph Merian, 2002
A print publication by net art pioneers Jodi. As you flip through the pages, you discover at first glance the colorful images of Jodi's net art and software art. Behind the foldout pages you will find textual analyses of their work, using a special binding method to create a paper equivalent of their art: the relationship between the images on the outside, the hidden texts, and the discovering reader, corresponds to the relationship between the visual

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surface of the screen, the source code behind it, and the user in Jodi's digital work.
(code, design, net art)

11. *Written Images*

Martin Fuchs and Peter Bichsel
2011
The book *Written Images* by Martin Fuchs and Peter Bichsel is still a traditional book, but each copy is created individually on a computer using 42 different artists' software, breaking the rigid serial nature of print. The book is a combination of several elements: print as a limited edition object, networked crowdfunding, computer processed information, hybridization of print and digital—all in a single object, a traditional book. However, this hybrid is limited in several ways: its process is complete once it is purchased by the reader; there is no further community process or networked activity; once purchased, it remains a traditional book on the shelf forever.
(generated, unicum, machine-driven)

12. *The SKOR Codex*

La Société anonyme
2012
The SKOR Codex is a printed book whose contents (text, images, and sounds) are binary coded and accompanied by visual instructions on how to reconstruct it by decoding. It is to be preserved for the future in a classic "time capsule" strategy. The human attitude to making such capsules (which are usually buried for posterity) is embodied here in the standards of a universal object (the book) and a copy has been commissioned to be preserved indefinitely in the special collections of national libraries.
(archival, code, reconstructive)

13. *AutoSummarize*

Jason Huff
2010
See chapter 2.
(processual, manipulative, deprived)

14. *1 the Road*

Ross Goodwin
Jean Boite Éditions, 2018
See chapter 4.
(locative, transduced, proof of concept)

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15. *Unhappening, not here not now*

Les Liens Invisible
2013
A book of images and basic descriptions of one hundred artworks completely invented but consistently compiled by researching images, automatically generating titles, and creating a brief description including year and technique for each "work of art." Here an entire genre (the art catalog, or artist's monograph) is challenged by showing how a working machine, properly instructed, can potentially mess up much of what we think of as "reality."
(processual, fake, manipulative)

16. *An Index(5)*

Philipp Adrian
2010
Adrian printed two volumes with all possible permutations of five letters and claims to have printed the index of Borges's Library of Babel, since the first five letters of any printed book must be contained somewhere.
(processual, proof of concept, permutable)

17. *The New York Times Special Edition*

The Yes Men and the Anti-Advertising Agency
2008
See chapter 3.
(fake, newspaper, appropriation)

18. *Daily Paywall*

Paolo Cirio
2015
See chapter 6.
(appropriation, collaborative, newspaper)

19. *Working On My Novel*

Cory Arcangel
Penguin Books, 2014
Working On My Novel is a book based on a Twitter feed that retweets the best posts with the phrase "working on my novel," transforming the "announcement culture" of social media and its potential emptiness into a collective graffiti.
(archival, Twitter, satire)

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20. *Print Wikipedia*

Michael Mandiberg
2009–2016
See chapter 4.
(appropriation, Wikipedia, sampled)

21. *E-book Backup*

Jesse England
2012
A printed book containing the entire text of George Orwell's *1984*, with each page containing a photocopied image of the corresponding page displayed on an Amazon Kindle. This refers to the highly controversial 2009 incident when Kindle users found their copies of *1984* and *Animal Farm* had been removed from their Kindles without their prior knowledge or consent. The publisher did not have the appropriate rights and Amazon later restored the copies and promised not to repeat such an incident in the future.
(appropriation, copyright, transduced)

22. *Contacts*

anonymous
International Neighborhood Verlag, 2014
See chapter 3.
(privacy, leak, appropriation)

23. *Ghostwriter* series

Traumawien
2012
This is an example of an artistic practice that deliberately uses other people's writings in a specific context. The Vienna group performed a virtual action using their own software robots that compiled and uploaded hundreds of e-books on Amazon.com that included text from comments on YouTube videos in what they called an "auto-cannibalistic" model. The e-books have a very classic paperback layout in that they are spontaneous instant books that redirect the endless stream of comments into a specific form and freeze them in time. Through this action, the original meanings are recontextualized and brought into a new scenario and literal form: heterogeneous personal comments, not necessarily related to each other, become one continuous, and sometimes surreal, dialogue. What happens in the

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transition from one medium to another is that the spontaneity, and sometimes naivety, of the text takes on the official character of the layout into which it is placed once it is rendered as a classic book.
(chat, appropriation, transduced)

24. *0.01s: The First 1/100th Second of 1-Bit Symphony*

Tristan Perich
Physical Editions, 2015
See chapter 4.
(archival, encrypted, code)

25. *Path*

Kate Armstrong
2008
See chapter 4.
(locative, generated, technical)

26. *Love Unknown*

Angie Waller
2014
The artist elaborates the announcements in Craigslist's "Missed Connections" in different cities in the US, automatically elaborating them as "stream of consciousness tales of unrequited love."[1]
(emotional, generated, locative)

27. *Baltimore Uprising: A Teen Epistolary*

anonymous
Research and Destroy, 2015
An unfiltered quasi-oral history archive of tweets posted during the riot following the death of 25-year-old Freddie Gray in the back of a Baltimore police van.
(historical, Twitter, legal)

28. *Of the Subcontract*

Nick Thurston
Information as Material, 2013
This is a collection of exactly one hundred poems, all written by a worker subcontracted through Amazon Mechanical Turk. Nick Thurston is the credited author, and the book includes a foreword allegedly written by

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McKenzie Wark, although it was contracted out to a ghostwriter in Lahore, Pakistan, for $75 dollars through Freelancer.com.
(mechanical turk, poetry, proof of concept)

29. *TBD Catalog*

Near Future Laboratories
2014
See chapter 3.
(fake, commercial, design fiction)

30. *Void Book*

edited by Margarete Jahrmann and Max Moswitzer,
Ludic Society, 2016
A printing experiment: a seemingly empty book whose content, printed in white on white pages, must be rescued, and which focuses on rules of the game as an epistemic thing that must be played accordingly.
(functional, playful, performative)

31. *Unpacking My Library*

Silvio Lorusso
2016
A conceptual experiment in online publishing in which Walter Benjamin's *Unpacking My Library* is converted word for word into directory names and represented by folders in the user interface. Lorusso creates both a flat version and a nested version.
(net art, computed, interactive)

32. *Steve, Harvey and Matt: As discussed with Nancy, we would like the content at the links below removed and archived as soon as possible*

Paul Soulellis
2018
This is an archival release containing 734 pages of emails and spreadsheets detailing the April 28, 2017, deletion of climate change material from EPA.gov by the US Environmental Protection Agency under the direction of then EPA Administrator Scott Pruitt and the Trump administration.
(archival, historical, reconstructive)

33. *The Best American Book of the 20th Century*

Société Réaliste
Onomatopee, 2015

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A composition with successive sentences from the bestselling books of the twentieth century, literally from 1900 to 1999, beginning with the first sentence of the first bestselling book of 1900 and ending with the thousandth sentence of the tenth bestselling book of 1999, with the proper names replaced by pronouns.
(generative, proof of concept, permutable)

34. *Theory*

Kenneth Goldsmith
Jean Boite editions, 2015
Five hundred texts—from poems to aphoristic thoughts to short stories—published on five hundred loose sheets and collected as an unbound stack of paper.
(permutable, proof of concept, archival)

35. *Printing Out the Internet*

Kenneth Goldsmith
2013
See chapter 5.
(archival, performative, sampled)

36. *Computed Curation*

Philipp Schmitt
2017
A photo book created by an algorithm that used machine learning and computer vision tools to curate a series of photos from an image archive, "considering more than 850 variables for each photo."[2]
(machine-driven, proof of concept, photography)

37. *Dictionary of Non-Notable Artists*

Gregor Weichbrodt
Frohmann Verlag, 2016
A dictionary compiled from Wikipedia's "Articles for deletion" pages, filtered by artistic profession.
(bot, appropriation, Wikipedia)

38. *Germania Markoviana*

Hannes Bajohr
2017
A text generated by Markov chain techniques using the right-wing online journal Sezession.de as a corpus. The cover and layout are modeled on the

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book *Finis Germania* by historian Rolf Peter Sieferle, which was selected for a recommendation list by a literary jury in Germany and triggered many polarizing discussions.
(generated, fake, historical).

39. *Diğerleri Gibi (Like the Others)*

Deniz Yılmaz
2016
The first book by an artificial poet whose public identity and algorithm were carefully constructed by Ebru Yetiskin and Bager Akbay. The "poet" appeared in national newspapers, art exhibitions, and public book signings, embodying clichés and absurd compositions in a practice Yetiskin calls "paratactical."[3]
(fake, generated, legal)

40. *META. Tracing Unknown Knowns*

edited by Mario de Vega, Victor Mazon Gardoqui, Daniela Silvestrin
2018
An experiment with a portable server, security print materials (UV ink), and a website that allows the contents of a seemingly blank book to manifest in the dark. It is a printed publication associated with an electronic device that senses and emits electromagnetic radiation generated by microwave telecommunication technologies.
(technical, unveiling, machine-driven)

41. *The Mimeograph: A Tool for Radical Art and Political Contestation*

Alt Går Bra
Alt Går Bra and Dimanche Rouge, 2016
A compilation of scholarly texts dedicated to mimeography printed on a mimeograph.
(analog, archival, technical)

42. *Objektivisering*

Marinos Koutsomichalis
2017
An experimental system that algorithmically generates 3D printable models from any user-defined text. This text is parsed and processed into a set of keywords/phrases that are then used as queries to retrieve 3D models from online repositories, which are then concatenated together.
(3D, machine-driven, transduced)

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43. *Monsanto Company Earnings Call Transcript*

Michalis Pichler
MOCA Skopje, 2010
The full transcript of the fourth quarter 2009 Monsanto Company Earnings Conference Call, which included representatives from Monsanto, JP Morgan, Goldman Sachs, and UBS.
(archive, dialogue transcript, copyright)

44. *On the Origin of Species* (*Evolutionary Edition*)

Simon Phillipson
2015
A book that visualizes the later revisions of Charles Darwin's most famous book in different colors, showing the evolution, and adaptation, of a seminal scientific text through design.
(data analysis, design, historical)

45. *Sic*

Annabel Frearson
2018
An experiment with a "paragrammatical" rewrite of the first volume of *Mein Kampf* (by Adolf Hitler, 1925) carried out by microworkers on a global scale. "A paragram is a verbal play that reorders the letters of existing words and phrases."[4] The author intends to reproduce the original language in a deviant way and in this way rewrite history.
(mechanical turk, appropriation, plagiarism)

46. *The Beautiful Poetry of Donald Trump*

Rob Sears
Canongate Books, 2017
The author cuts together and rearranges Trump's tweets and transcripts, combing his words for signs of poetry—with quite hilarious results.
(data analysis, poetry, man/machine)

47. *Evolution*

Johannes Heldén and Håkan Jonson,
2013
This is the result of a Java-based AI application that emulates the writing of the poet and artist Johannes Heldén. It analyzed a corpus of all the poet's published texts and generated poems that simulate his specific style.
(data analysis, generated, poetry)

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48. *Between Page and Screen*

Amaranth Borsuk and Brad Bouse
Siglio, 2012
A book of poems that can be read in their own animated form after a QR code printed on the book has been exposed to the laptop camera and interpreted by special software. What we can read is a three-dimensional perception of the screen, a classic augmented reality that becomes our "reading space," possibly even animated, extending the print directly on the screen.
(AR, poetry, unveiling)

49. *Plagiarism*

Felipe Cussen
2020
The author searched prestigious universities' websites for definitions of plagiarism, and then passed the found paragraphs to the online evaluating tool Plagiarism Director with surprising results, as some of them scored a "100% plagiarism." The book is made of screenshots of the digital process with all the data.
(plagiarized, sampled, unveiling)

50. *C.O.P.Y.*

Martin Wecke
2013
A publishing experiment with a seemingly blank book that, when photocopied or scanned, reveals the essay "Copyright, Copyleft and the Creative Anti-Commons" attributed to the Neoist avatar Anna Nimus (2006).
(copyright, unveiling, reconstructive)

51. <script>*alert ("!Mediengruppe Bitnik");*</script>

Mediengruppe Bitnik (design by Christoph Knoth and Konrad Renner)
Verlag für moderne Kunst, 2017
The title of this monograph by a critical media art group is written as JavaScript code, which is then executed when found in online bookshops and generates a pop-up window with their name.
(code, technical, unveiling)

52. *6×6/36*

Collectif Nunc
Subjectile, 2012

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A series of exhibitions in the form of publications where the artworks are accessible through stickers with a QR code so that readers can recreate the exhibition in their own homes or any other space.
(net art, QR, machine-driven)

53. *The Infinite Conversation*

Giacomo Miceli
2022
See chapter 2.
(fake, generated, human/machine)

54. *Mini Daily Mail*

Spelling Mistakes Cost Lives (Darren Cullen)
2018
A miniature, 32-page drawn version of the *Daily Mail*, which makes the emotional qualities of the original "distilled to its angry, horny core."[5]
(satire, fake, appropriation)

55. *Critical Making*

Garnet Hertz
2012
A handmade series of zines forming a "book" that critically examines the notion of "making" through various contributions and reflects on technology and society.
(zine, making, collaborative)

56. *Eye*

Jochem Hendricks
2001
Drawings made directly with the eyes as a result of reading newspapers (the *Frankfurter Allgemeine Zeitung* and an issue of *EYE*, the weekly cultural supplement of the San José *Mercury News*), which led to both scanning with the eyes and an abstractly perceived newspaper structure.
(technical, man/machine, newspaper)

57. *Dark Sound*

Mikel R. Nieto
Gruenrekorder, 2016
A conceptual experiment with a black book with black opaque pages printed in black ink and priced by the price of Brent crude oil at the time of purchase, so that the author and music label warn that if you buy the

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book you are "contributing to the destruction of the planet."[6] The content is a collection of essays, images, and documents about the impact of the oil industry on Ecuador's natural environment with a CD of thirty-four recordings in one track from the Ecuadorian rainforest.
(design, proof of concept, structural)

58. *International Directory of Fictitious Telephone Numbers*
Martin John Callanan

GREYISGOOD, 2011
This book is a collection of fictitious telephone numbers that are designated never to function because they have been compiled according to the telephone companies' rules of exception.
(archive, technical, fake)

59. *Autonomous Parapoetic Device (APxD mkII)*

Allison Parrish
2008
A portable machine that generates poetry and is light enough to be easily carried around. It's contained in an old wooden box and is made from a simple LCD display (with a capacity of 20×4 characters) presenting text that is constantly being replaced. So, the "final" poetry never really arrives, but it reflects the ephemerality of the process and the aura of the "magical."[7]
(generated, portable, unicum)

60. *City Strips Issue #1 (February 2014): The Amazing City*

2014
A comic book consisting entirely of panels from the *Amazing Spiderman* series in NYC from 1963 to 1974. It reconstructs the view of the city during those years through silent panels depicting architectural elements.
(comic, abstract, deletionist)

61. *Tristano*

Nanni Balestrini
Derive e Approdi 2007 and Verso 2014
See chapter 2.
(generated, archival, historical)

62. *Mein Kampf/Cosmopolitan*

Álvaro Carmona
2016

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This is a reediting of *Cosmopolitan Spain*'s January 2016 issue. Carmona replaced every single word in it with passages from Adolf Hitler's *Mein Kampf*, leaving the original layout, photographs, and fonts untouched in a meticulous process. Carmona wanted to criticize the totalitarian values that these kinds of magazines dictate to women, indoctrinating them into gender roles. The form is literally untouched from the original, immediately associable with the magazine format, domain, and style.
(plagiarised, design, manipulative)

63. *A Universe Explodes*

Tea Uglow
Editions At Play, 2017
An experiment in digital book ownership. Only one hundred people can own the book, and each time it is passed on to another person, the owner must remove two words and add one word on each page to create a personalized limited edition controlled via blockchain.
(machine-driven, performative, collaborative)

64. *Spam Bibliography*

Angela Genusa
Troll Thread Press, 2013
A book consisting of every spam email the artist has received, listed in correct bibliographic formatting.
(archival, spam, sampled)

65. *The Wizard of Oz* (book)

Dennis Neuschaefer-Rube
2012
In this book, all 140,000 film stills of the film are published on 98 pages. The images on the pages are arranged chronologically, so that each page, which contains 1,440 images, corresponds exactly to one minute of the film.
(archival, sampled, reconstructive)

66. *The Book and the E-Book*

Rahel Zoller
2012
An e-book with an English translation of Umberto Eco's short story *The Inner Monologue of an E-Book* and a printed book that is the paper copy of

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The Inner Monologue of a Book by Rahel Zoller. The two stories on different devices are self-explanatory.
(design, performative, proof of concept)

67. *Forgot Your Password?*

Aram Bartholl
2013
After the leak in 2012 of LinkedIn.com user passwords, the stolen list surfaced online and was printed in these eight volumes, which contain a total of 4.7 million plaintext LinkedIn user passwords in alphabetical order.
(archival, leak, machine-driven)

68. *Twentysix Gasoline Stations 2.0*

Michael Maranda
Parasitic Ventures Press, 2010
A rough reconstruction of the iconic art book *Twentysix Gasoline Stations* by Edward Ruscha based on images available online.
(reconstructive, appropriation, copyright)

69. *Lady Chatterley's Tinderbot*

Libby Heaney
2016
See chapter 2.
(chat, bot, anachronism)

70. *How It Is in Common Tongues*

John Cayley and Daniel C. Howe
NLLF PRESS, 2012
A book that searches online for the text of Samuel Beckett's *How It Is* and reports at which URL the same sentence can be found.
(sampled, metapublication, technical)

71. *Every Face in the Americans*

Dafydd Hughes
2010
This is a remake of Robert Frank's groundbreaking photo book *The Americans*, preserving only the faces algorithmically recognized by iPhoto software. The book is modeled as closely as possible on the 1977 edition of *The Americans* from which the scans were made.
(face recognition, sampled, photography)

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72. *Non-words*

Daniel Temkin
2017
See chapter 2.
(bot, twitter, zine)

73. *Apostrophe*

Bill Kennedy and Darren Wershler-Henry
ReadHowYouWant.com, 2006
Starting with a 1993 poem by Kennedy entitled *apostrophe (1994)*, which consists of a six-page list of "you are . . ." statements, they developed the "apostrophe engine" software to search the Internet and generate a new, similar poem.
(poetry, generated, human/machine)

74. *Obituary* series

Adam McEwen
2000–
An ongoing series of premature obituaries of celebrities realized in their lifetime, including Kate Moss, Jaron Lanier, Greta Thunberg, Lewis Hamilton, and others, printed as newspaper facsimiles with licensed images. McEwen has previously written obituaries for the *Daily Telegraph*. Here he develops an artistic appropriation of a well-known hidden practice in newspaper editorials, creating accurately written pieces that are utterly believable but displaced in space and time.
(newspaper, manipulative, fake)

75. *The Unassuming Collection*

Chris Gibson
2018
A poem set in a library that unfolds through printed images and QR codes to download all the related books.
(QR code, archival, reconstructive)

76. *Hard West Turn*

Nick Montfort
2018
See chapter 2.
(postdigital, processual, code)

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77. *Language Redux*

Pip Thornton
2018
Thornton wrote the script {poem}.py as "linguistic capitalism."[8] The script breaks down texts and calculates from the individual words the monetary value they have as keywords in search engine advertising programs and prints out a receipt.
(code, estimated, Google)

78. *Kioskbaskere til Alle*

Linda Hilfling Ritasdatter
2013
In this work, *Blockbusters for All*, e-book versions of Danish bestsellers had "word marks"—words or phrases registered as trademarks regardless of their graphic representation—replaced with blanks. Various parts could then be missing from the novels, including the names of the protagonists, highlighting the invasive potential of copyright laws.
(deletionist, copyright, proof of concept).

79. *Avant. Et maintenant.—Raymond Queneau*

Reading Club (Annie Abrahams and Emmanuel Guez)
2013
Annie Abrahams and Emmanuel Guez's Reading Club is a performance in which some writers rewrite a text live over the Internet for a limited time and with some automatically set rules. It starts with a fixed space on a printed page and transforms into the digital space of the digitized text, which for a limited time becomes a "fluid text" in a unique (digital) space, where the live writing, which is also a mutual textual intervention, makes the text swim in a sea of meanings and emotions through a public act of construction and deconstruction of meaning. For this particular performance, which took place at Jeu de Paume and online, Abrahams and Guez's choice of an extract from Raymond Queneau's *Exercises in Style* as a source text could not have been more symbolic.
(performative, collaborative, postdigital)

80. *Art Post-Internet*

Karen Archey and Robin Peckham
Ullens Center for Contemporary Art, 2014
Catalog in pdf format for the exhibition of the same name at the Ullens Center for Contemporary Art in Beijing. The title page is created each time

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with the user's IP address and approximate location. It contains a preliminary definition of the term "post-Internet" by various artists and critics.
(performative, proof of concept, net art)

81. *No-ISBN: On Self-Publishing*

edited by Bernhard Cella
Salon für Kunstbuch, 2016
An edited anthology and catalog of artists' books that deliberately forgo an International Standard Book Number (ISBN), signifying a withdrawal from the international book trade and an implicit request for limited distribution, if not invisibility. It catalogs more than 1,800 printed publications.
(archival, proof of concept, library)

82. *The Black Book*

Jean Keller
2010
A test of the print on demand service Lulu, in which a book with the maximum number of pages was printed entirely in black to show that the platform's cost calculation does not reflect market prices for ink.
(reductio-ad-absurdum, technical, print on demand)

83. *My Hard-Drive Died Along With My Heart*

Thomas Walskaar
2016
The book contains posts from online forums and tweets from social media from 1994 to 2016 on the topic of "data loss," from the perspective of people who have lost information and are struggling with the consequences of nonfunctioning or defective hard drives.
(archival, collaborative, sampled)

84. *buymyprivacy.com: Location 1*

Barron Webster
2015
A book of three months' data on places the author has visited. He compiles these books and sells them as a parody of companies collecting personal data, considering that if companies can sell his private data, he can do it too. Part of a series with various other data domains.
(satire, archival, privacy)

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85. *And Printed in a Book*

Aaron Krach
2017
The artist bought consistent collections of images found on eBay on various subjects and printed them in books. Box of ten books.
(archival, sampled, eBay)

86. *Photography Is*

Mishka Henner
2010
Following a strategy appropriated by artists using Google's predictive search "autocomplete," this book contains more than three thousand sentences defining the "ambiguous and untrustworthy nature of photographs themselves," each sentence decontextualized. As the author notes, "it is photography, without photographs."[9]
(proof of concept, collaborative, sampled)

87. *asoue*

Michael Wolf
Wanderer Books/Peperoni Books, 2010
In *asoue,* which stands for "a series of unfortunate events," Michael Wolf photographs accidents in Google Street View in a certain area of the computer screen as if they were taken on the street and then publishes them in a classic photo book.
(photography, Google, transduced)

88. *93.1 JACK FM LOS ANGELES 2008*

Guthrie Lonergan
2008–2012
Using a "website scraping script," this is a five-volume book series on all the songs played by Los Angeles radio station 93.1 JACK FM in 2008, arranged alphabetically by artist.
(archival, reconstructive, transduced)

89. *Public Access*

David Horvitz
2013
The artist photographed over fifty different beaches during a trip to California. In each photo he is "looking out at the beach and other scenic vantage points."[10] He then uploaded the photos to the corresponding Wikipedia

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pages about the respective beaches. At some point, Wikipedia debated the legality of his photos and deleted most of them. This book contains images of the Wikipedia pages, the original images, and the full conversations with Wikipedia about the images.
(photography, archival, performative)

90. *Professionalisation*

Scott Massey
2011
A book compiled by the artist by searching Google with the phrase "professionalisation of the artist" and then selecting five articles with pro and con arguments.
(Google, sampled, appropriation)

91. *A Room of One's Own/A Thousand Libraries*

Kajsa Dahlberg
2006
This is a compilation of all marginal notes made by readers in the Swedish library copies of Virginia Woolf's 1929 essay, "A Room of One's Own."
(archival, ephemeral, library)

92. *The Black Merkin*

New Society of Dilettanti (Laura Edbrook and Norman James Hogg)
2011
This book is about the idea of writing "an entire romance novel on a 'tribal' model of authorship."[11] The project began by randomly selecting an e-book from a downloaded BitTorrent of more than one hundred titles. Then they offered individuals the chance to take part in a "mass reconstruction of the novel." They could each rewrite a three-hundred-word piece, keeping all the names of the characters and places. In the final version, all the names of the characters and places were replaced, creating a "new" collective novel.
(collaborative, proof of concept, structural)

93. *The Every Piece of Art in the Museum of Modern Art Book*

Jason Polan
2005
The artist drew each artwork on display at the Museum of Modern Art from January 19 to January 30, 2005, in black and white.
(archival, proof of concept, structural)

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94. *Re-Writing Freud*

Simon Morris and Christine Morris
Information as Material, 2005
This book is the result of a computer program that randomly selects words from Freud's 222,704-word text *The Interpretation of Dreams* and attempts to reconstruct the entire book word for word, creating a new book with the same words each time the program is restarted. This edition was graphically and structurally similar to Freud's original edition.
(appropriation, sampled, permutable)

95. *Suitcase Body Is Missing Woman*

Eva Weinmayr
Book Works, 2005
A collection of newspaper posters of "news splashes" arranged in alphabetical order to make different sense.
(archival, newspaper, sampled)

96. *Witteveen+Bos Art+Technology Award* book

Geert-Jan Hobijn
2014
See chapter 1.
(sound, proof of concept, analog)

97. *Humanpédia*

David Guez
2013
See chapter 5.
(collaborative, appropriation, library)

98. *Pharmako-AI*

K Allado-McDowell
Ignota, 2020
See chapter 2.
(performative, generated, human/machine)

99. Bruckner-*Further Book Single*

C. Hausch and Uli Kühn, feat. Bruckner
Moozak, 2015

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Another attempt to archive the digital with paper. Bruckner's single track was printed in hexadecimal numbers, which fits better with the audio data in two books, one for the left and one for the right channel.
(archival, music, proof of concept)

100. *Profile Page*

Florian Freier
2015
A photographic documentation of six hundred standardized student flats with a direct comparison to the Facebook profile page of the respective student, confronting the private physical dimension with the public online dimension.
(archival, photography, postdigital)

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